SEPTEMBER 1953

PRECISION METAL MOLDING

INCLUDING DIE CASTINGS MAGAZINE

DIE CASTINGS
INVESTMENT CASTINGS
POWDER METALLURGY
PERMANENT MOLD CASTINGS
PLASTER MOLD CASTINGS
SHELL MOLDINGS

DESIGN • MANUFACTURE • FINISHING • USE

GUARDING THE QUALITY OF *YOUR* ZINC DIE CASTINGS

LICENSEES under the CZ ALLOY PLAN

A & A Die Casting Co., West Los Angeles, Calif.
The Accurate Die Casting Co., Cleveland, Ohio
Advance Pressure Castings, Inc., Brooklyn, N. Y.
Advance Tool & Die Casting Company, Milwaukee, Wis.
Badger Die Casting Corp., Milwaukee, Wis.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Cleveland Hardware & Forging Co., Cleveland, Ohio
Congress Drives Division, Tann Corp., Detroit, Mich.
Continental Die Casting Corp.,
Division of F. L. Jacobs Co., Detroit, Mich.
Crown City Die Casting Co., Pasadena, Calif.
Doehler-Jarvis Corp., Pottstown, Pa.
Doehler-Jarvis Corp., Toledo, Ohio
Dollin Corporation, Irvington, N. J.
Du-Wel Metal Products, Inc., Bangor, Mich.
Federal Die Casting Company, Chicago, Ill.
Globe Imperial Corporation, Rockford, Ill.
C. M. Grey Mfg. Co., East Orange, N. J.
Heick Die Casting Corp., Chicago, Ill.
Hilfinger Corporation, Toledo, Ohio
The Hoover Company, North Canton, Ohio
Kiowa Corporation, Marshalltown, Iowa
Paul Krone Die Casting Co., Chicago, Ill.
Madison-Kipp Corporation, Madison, Wis.
Milwaukee Die Casting Company, Milwaukee, Wis.
Monarch Aluminum Mfg. Co., Cleveland, Ohio
Mt. Vernon Die Casting Corp., Mt. Vernon, N. Y.
Paragon Die Casting Company, Chicago, Ill.
Parker White Metal Co., Erie, Pa.
Precision Castings Company, Inc., Fayetteville, N. Y.
Precision Castings Company, Inc., Cleveland, Ohio
Precision Castings Corp., Chicago, Ill.
Pressure Castings, Inc., Cleveland, Ohio
Racine Die Castings Co., Racine, Wis.
St. Louis Die Casting Corporation, St. Louis, Mo.
Schultz Die Casting Company, Toledo, Ohio
Sterling Die Casting Co., Inc., Brooklyn, N. Y.
Stewart Die Casting Division
of Stewart-Warner Corp., Bridgeport, Conn.
Stewart Die Casting Division
of Stewart-Warner Corp., Chicago, Ill.
Stroh Die Moulded Casting Co., Milwaukee, Wis.
The Superior Die Casting Company, Cleveland, Ohio
The Tool-Die Engineering Co., Cleveland, Ohio
Twin City Die Castings Company, Minneapolis, Minn.
Union Die Casting Co., Ltd., Los Angeles, Calif.
Universal Die Casting Company, Los Angeles, Calif.
Wells Die Casting Co. of Calif., San Francisco, Calif.
Western Die Casting Co., Emeryville, Calif.

At no extra cost, you enlist the services of an extra guardian when you have your die castings made by one of the listed die casters, licensed CZ producers.

Under the **Certified Zinc Alloy Plan,** your die castings are subject to periodic, searching scientific scrutiny to make certain that they are *on grade,* that the alloy meets the specifications *you* set.

CZ stands guard on your every job to make sure that each and every one of your die castings is of a consistently superior quality.

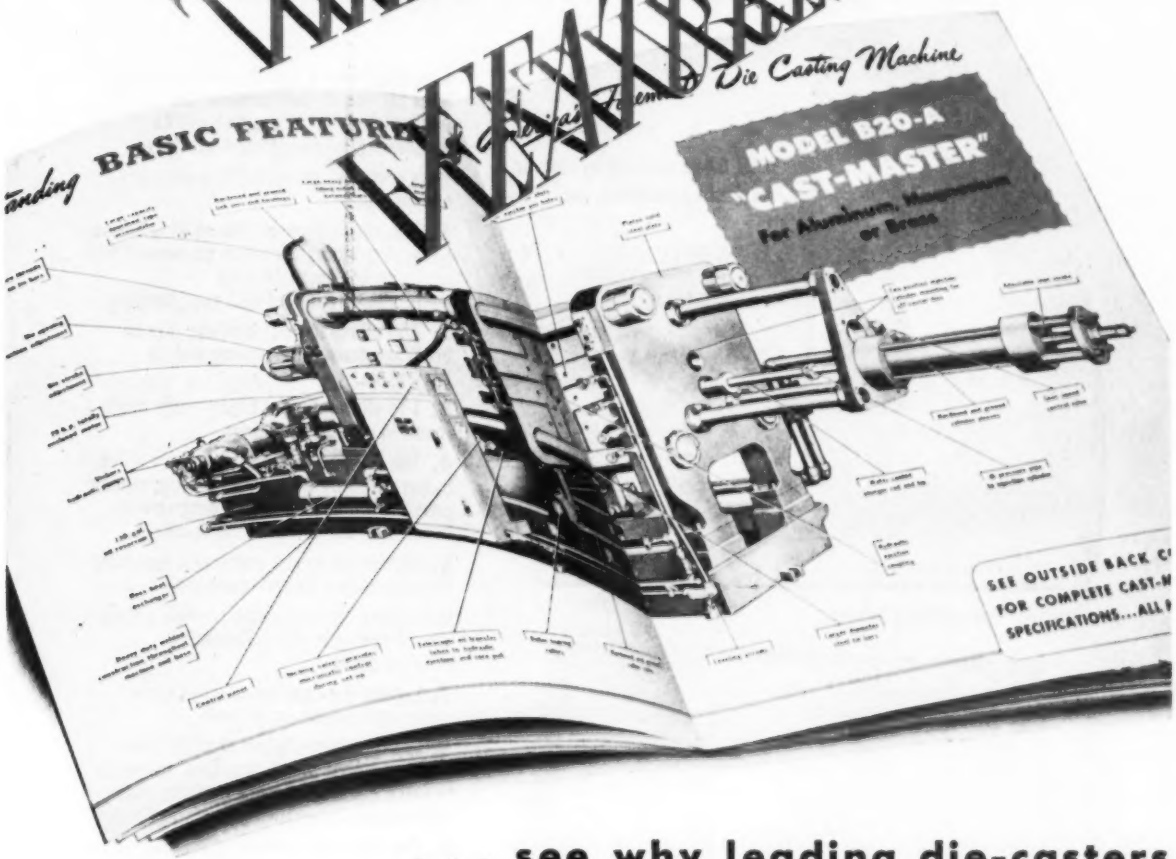
For full details of the CZ Plan, write today without obligation.

AMERICAN DIE CASTING INSTITUTE, INC.

366 MADISON AVENUE NEW YORK 17, N. Y.

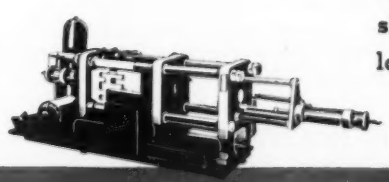
For additional information Circle No. 7 on the Reader Service Card

COMPARE THESE FEATURES!



. . . see why leading die-casters choose CAST-MASTER

If die-casting is your business, you'll find it's *smart* business to compare Cast-Master features before choosing any machine. The new Cast-Master catalog gives you the story feature-by-feature—shows all the "extras" that mean more Speed and Accuracy—and lower Maintenance Costs. Your free copy is ready.



SEND FOR CATALOG!

CAST-MASTER *Inc.* 2123 HAMILTON AVE. CLEVELAND 14, OHIO

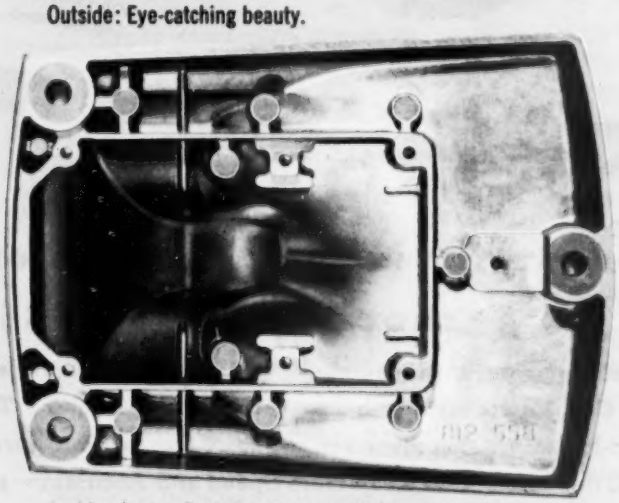
For additional information Circle No. 10 on the Reader Service Card

"FAN MAIL"

FASCO INDUSTRIES, INC., writes, "We're saving money right down the line with **DIE CASTINGS BY HOOVER"**

FAN BASE die cast by Hoover for Fasco Industries, Inc.

Outside: Eye-catching beauty.



Inside: A complicated pattern precisely reproduced.

Changing from a cast-iron to a die cast base for one of their popular fan models has resulted in 10 specific benefits for this highly-pleased manufacturer.

Here they are, according to a company spokesman:

1. The elimination of "re-working" bases.
   a. A grinding operation to remove flash on the cast-iron neck.
   b. Heat treatment and sand blasting.

2. The elimination of spoilage due to breakage caused by chilling and/or hard spots.

3. The elimination of filling rough spots found in cast-iron castings.

4. The elimination of tapping four holes in the cast-iron bases. Die casting makes possible the use of self-tapping screws because of the softer metal involved.

5. Lighter die-cast bases make assembly line operations easier—save time.

6. Lighter die-cast bases provide a freight charge saving in the shipment of finished goods.

7. Lighter die-cast bases make stock room work easier—save time.

8. Die-cast bases, when stocked prior to entering our production line, are easier to stack because of more uniform base thicknesses—save time and storage space.

9. The smoother surface of die-cast bases, allow the usage of a smooth enamel paint—eliminate costly repainting.

10. Die-cast bases give a consistent quality with a high daily productive capacity.

How about something you're making?

Hoover's specialized skill, complete facilities and cost-wise production methods may help you, too, save a lot of money.

Call in a Hoover Engineer and talk it over before you finalize your plans. For informative booklet, "Die Castings", write:

GET A BID FROM

Specialists in the field of Die Casting since 1922

THE HOOVER COMPANY
DIE CASTINGS DIVISION,
North Canton, Ohio

For additional information Circle No. 17 on the Reader Service Card

SEPTEMBER 1953
Vol. 11 No. 9

IRVING B. HEXTER
President

LESTER P. AURBACH
Executive Vice-President

EDWIN M. JOSEPH
Vice-President

STAFF

DAVID W. VEIT
Editor

PHILIP R. KALISCHER
Associate Editor

A. W. BENKENDORF
Production Manager

EDWIN M. JOSEPH
Circulation Director

All communications should be addressed to PRECISION METAL MOLDING, 1240 Ontario St., Cleveland 13, Ohio. Phone SUperior 1-9622. AT&T Teletypewriter No. CV-233.

SALES OFFICES

NEW YORK OFFICE—
LEE HAAS, Eastern District Mgr.
STEPHEN SHEPARD
ROBERT MACBETH
60 E. 42nd St.—Room 803
New York 17, New York
Murray Hill 7-3420

CLEVELAND OFFICE
ROBERT SHATTUCK
ROBERT SIMMONS
1240 Ontario St.
Cleveland 13, Ohio
SUperior 1-9622

CHICAGO OFFICE—
LLOYD WILLOUGHBY
RAY GROSS
Suite 1613-1615
520 N. Michigan Ave.
Chicago 11, Illinois
WHitehall 3-1655-56-57

LOS ANGELES OFFICE—
ALAN CAZIER
3259 Wilshire Blvd.
Los Angeles 5, California
Dunkirk 8-2201

LONDON OFFICE—
JOHN A. LANKESTER
5 New Bridge St.
Fleet St.
London, E. C. 4, England

CCA

MEMBER mpa METAL POWDER ASSOCIATION

Copyright 1953 by the Technical Publishing Co.

PRECISION METAL MOLDING

DIE CASTINGS • INVESTMENT CASTINGS • PLASTER MOLD CASTINGS

PERMANENT MOLD CASTINGS • POWDER METALLURGY • SHELL MOLDINGS

CONTENTS

LETTERS TO THE EDITOR 12
BETWEEN THE LINES 22
AMERICAN DIE CASTING INSTITUTE celebrates its silver anniversary 45
Die castings in higher temperature alloys may result from DIE STEEL STUDIES of the Die Casting Research Foundation .. 48
RESEARCH GROUP attracts 62 members 50
Research Foundation seeks answers to two questions: HOW DO DIE STEELS HEAT CHECK? WHICH DIE LUBRICANTS ARE BEST? 51
PRODUCT STANDARDS AND COST ACCOUNTING head ADCI program 53
OFFICERS DURING ADCI'S FIRST 25 YEARS 54
THREE INSERTS DO THREE JOBS in a flywheel magneto 56
Properties and uses of die castings in the LOW MELTING ALLOYS 58
WHY SAND CASTINGS LOSE OUT in competition with more accurate parts 62
THREE REASONS to use investment cast parts 67
PROMOTIONS AND APPOINTMENTS 99
SIMPLIFIED SOLUTIONS for production problems 106
INDUSTRY NEWS 109
Comparison of IMPREGNANTS for aluminum and magnesium castings 114

FINISHING SECTION

SPECIAL FIXTURES SAVE LABOR in polishing die cast window frames 73
Large, complex aluminum die castings BRIGHT POLISHED IN A BARREL 79
NEW PRODUCTS 81
REFERENCE MATERIAL in this month's ads 84
USEFUL LITERATURE 87

Published monthly by the TECHNICAL PUBLISHING COMPANY, an affiliate of INDUSTRIAL PUBLISHING COMPANY, publishers of APPLIED HYDRAULICS, FLOW, INDUSTRY & WELDING, OCCUPATIONAL HAZARDS, COMMERCIAL REFRIGERATION AND AIR CONDITIONING. Member Controlled Circulation Audit, Inc. Not responsible for unsolicited editorial material. Indexed regularly by Engineering Index, Inc.

Subscription rates: United States and possessions—$3.00 per year; $5.00 for 2 years; Canada—$4.00 per year, $6.00 for 2 years; Foreign—$5.00 per year. Subscriptions to the United Kingdom £1.10 per annum, payable in Sterling to our London office. Single copy price 50 cents. All subscriptions subject to individual acceptance by the publisher.

Published monthly. Acceptance under Section 34.64 P. L. & R. authorized at Marion, Indiana.

ALUMINUM ALLOYS

For Die Casting, Permanent Mold and Sand Casting

. . . are laboratory controlled for quality

Wherever they are used, the Silver Star brand of quality controlled aluminum alloys will help you produce better castings at lower cost. Each melt is checked by skilled technicians using the most modern testing equipment available to guarantee that each ingot meets your specific requirements. Complete information and prices will be supplied promptly to your inquiry. Write or call today.

Aluminum Smelting & Refining Co., Inc.

BEDFORD, OHIO • PHONE CLEVELAND MOntrose 2-3700

INDIANAPOLIS, INDIANA
215 Circle Tower
Phone: MArket 6000

DETROIT 27, MICHIGAN
P. O. Box 4014
Phone: VErmont 7-9962

ZAMAK

ZINC DIE CASTING ALLOYS

TO SERVE YOU BETTER . . .
CERTIFIED announces the construction of a new alloying plant at Los Angeles (Rivera), California.

. . . produced to your exacting requirements

You can be sure of uniform castings and efficient production when you use quality controlled Certified zinc. Each order, large or small, receives personalized attention from our skilled team of specialists. And with the completion of our expansion program we will be able to make prompt nationwide deliveries on all requirements.

Complete product information and technical assistances are yours for the asking. Call or write today.

CERTIFIED ALLOYS CO.

BEDFORD, OHIO • PHONE: CLEVELAND MOhawk 2-3100

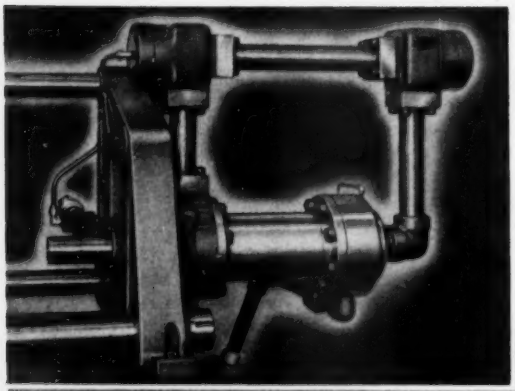
INDIANAPOLIS, INDIANA
215 Circle Tower
Phone: MArket 4000

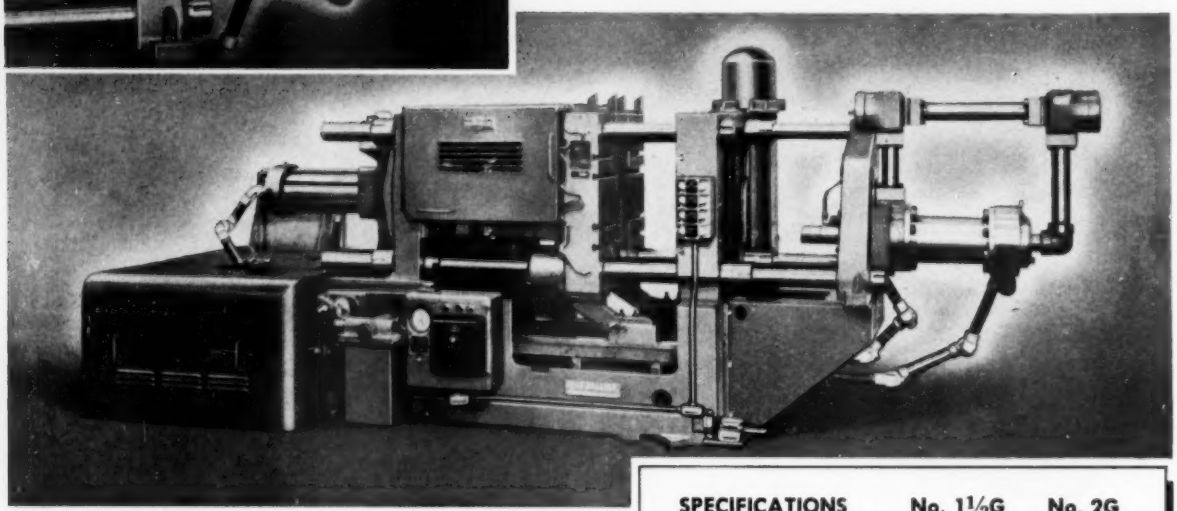
LOS ANGELES PLANT
9323 Bermudez St. Rivera, Calif.
Phone: OXford 9-9510

DETROIT 27, MICHIGAN
P. O. Box 4014
Phone: VErmont 7-9962

For additional information Circle No. 3 on the Reader Service Card

PRODUCE DENSE, "HARDWARE FINISH"
DIE CASTINGS ON REED-PRENTICE MACHINES
with NEW HI-SPEED HI-PRESSURE PLUNGER UNIT





Reed-Prentice Cold Chamber Die Casting machine — equipped with the new "Hi-Speed Hi-Pressure" Plunger attachment — produces dense, unblemished aluminum and magnesium die castings that greatly eliminate expensive finishing operations.

Effecting lower unit costs, these higher quality die castings result from *actual plunger speed of 10,000 inches per minute* combined with a final squeeze at high pressure.

The "Hi-Speed Hi-Pressure Plunger" attachment can readily be applied to Reed-Prentice No. 1½G and 2G machines now in use and can be furnished as an extra on new 1½G and 2G machines.

SPECIFICATIONS	No. 1½G	No. 2G
Size of die plates	32 x 29"	38 x 36"
Space between tie bars	20 x 15"	23½ x 23½"
Diameter of tie bars	4"	4½"
Die opening	10¼"	14"
Maximum die space	22"	30"
Die locking pressure, tons	250	400
Capacity per shot (Aluminum)	3.75 lbs.	9 lbs.
Machine weight, lbs.	14,500	22,700

Write for the New "Hi-Speed Hi-Pressure" Plunger attachment bulletin today.

MAIN OFFICE
677 Cambridge St., Worcester 4, Mass.

BRANCH OFFICES
75 West St., New York 6, N. Y.
1213 West 3rd St., Cleveland 13, Ohio
4001 N. Elston Ave., Chicago 18, Illinois
2842 W. Grand Blvd., Detroit 2, Michigan

DIE CASTING
REED-PRENTICE CORP.
WORCESTER MACHINES MASS., U.S.A.

REPRESENTATIVES:
Houston..Preston Machine Tool Sales Co.
Seattle & Spokane..Star Machinery Co.
Minneapolis.....Chas. W. Stone Co.
Los Angeles Western Molders Supply Co.

MANUFACTURERS OF LATHES, MILLERS, DIE CASTING AND PLASTIC INJECTION MOLDING MACHINES

For additional information Circle No. 38 on the Reader Service Card

WE CONGRATULATE **ADCI**

ON ITS SILVER ANNIVERSARY...

AND SUGGEST IF YOU'RE *"on the fence"*

ABOUT ALLOYS, CHOOSE

HENNING

Zamak

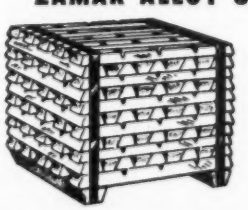
FOR OVER 30 YEARS THE PREFERENCE OF DISCRIMINATING BUYERS

If you are now using HENNING Die Casting Alloys there is nothing more we can tell you about our Quality and Service.

If not we urge you to try our product and be convinced of its superiority. Our private railroad siding facilitates fast shipment. A certified analysis accompanies every order. All ingot produced under the most rigid laboratory control. We also produce Secondary Aluminum Die Cast Alloys.

Inquiries Invited!

ZAMAK ALLOY UNIT LOADING PACKAGES



For added convenience we ship your ZAMAK (zinc base) DIE CASTING ALLOYS strapped on consumable runners of the same alloy. SAVES time. SAVES handling.

THE INITIALS

HB & S

SYMBOLIZE COMPLETE SATISFACTION

HENNING BROS. & SMITH, INC.

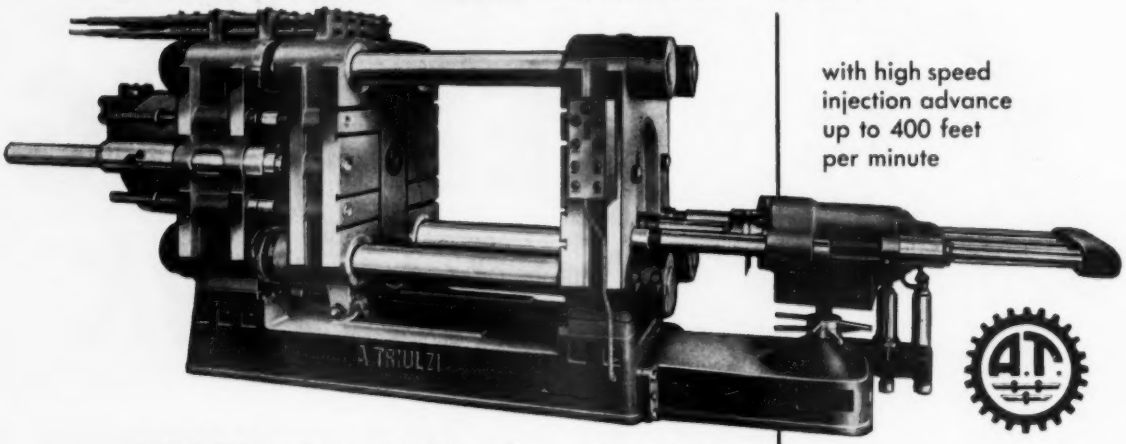
91-113 Scott Avenue • Brooklyn 37, N. Y.

"DEPENDABLE SERVICE SINCE 1922"

Eliminate Fire hazard and Down time!

A. TRIULZI
Die Casting Machines

For Continuous Production



with high speed injection advance up to 400 feet per minute

TRIULZI Die Casting Machines, famous throughout Europe for their power, strength and ease of operation are now available on this continent in a wide range of models built to American standards.

PRICED UNUSUALLY LOW FOR COMPARABLE CHARACTERISTICS

DELIVERY WITHIN 90 DAYS!

PARTIAL SPECIFICATIONS

	501	102	2000	8000	12000S	12000	16000	Z.25
Locking pressure (tons)	29	56	117	219	400	430	737	56
Injection pressure (tons)	3.2	5.7	10	21.5	24	41.2	58.5	2.4
Size of plates (in.)	12x12	18x17	22x24	26x26	26x26	44x35	52x44	18x17
Size of plates between bars	12x12	18x17	22x24	26x26	26x26	29x21	34x22	18x17
Stroke of mobile plate (in.)	9	14	14	20	20	26	28	14
Weight (lbs.)	2200	3500	6600	12100	18600	26400	35200	4400
Capacity (cu. in.)	7-15	9-19	13-30	40-76	40-76	79-171	103-228	8-17

THESE IMPORTANT FEATURES AND MANY MORE . . .

- Equipped with a non-clogging *water* hydraulic system that eliminates fire hazard and reduces down time.
- Air accumulator pumping system and electric controls designed for minimum space and to suit your plant requirements.
- Automatic cycle operation.
- Two interchangeable shot positions.
- Fixed plate has 2 or 3 injection positions and T-slots.
- Supporting adjustable wheels for mobile plate.
- Equipped with central hydraulic ejector erected on die support and re-entering in the mobile plate . . . It is possible to move ejector sideways from its position for a displacement of ½".
- Demountable tiebars and hard chromed pistons.
- Purchase price includes complete installation. Service and parts always available.

See a demonstration of the TRIULZI Die Casting Machine in our Norwalk, Conn. display rooms. For an appointment or for complete specifications and prices, telephone or write us now!

KELVIN SYSTEMS CORPORATION

IMPORTERS OF MACHINERY AND MACHINE TOOLS

135 FRONT ST., NEW YORK 5, N. Y. • WHITEHALL 3-2944

For additional information Circle No. 71 on the Reader Service Card

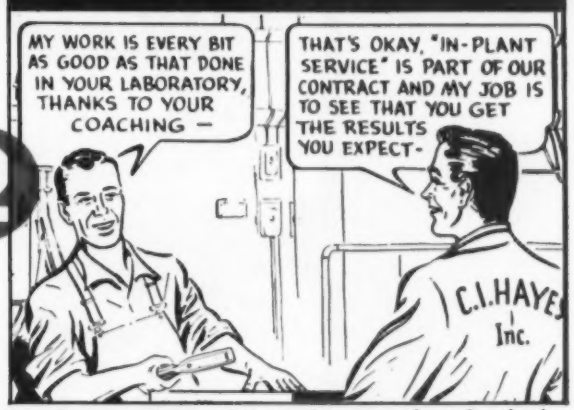
For BEST results in SINTERING and HARDENING Metal Powders

IN HAYES LAB

1
YOU SAY THE FURNACES IN THIS LABORATORY ARE STANDARD PRODUCTION EQUIPMENT ?
YES, WHATEVER PROCEDURE WE ESTABLISH HERE CAN BE DUPLICATED IN YOUR PLANT ON A PRODUCTION BASIS -

Run samples or your work in Hayes Lab to pre-insure your purchase by demonstrating the results you require.

IN YOUR PLANT


2
MY WORK IS EVERY BIT AS GOOD AS THAT DONE IN YOUR LABORATORY, THANKS TO YOUR COACHING -
THAT'S OKAY, "IN-PLANT SERVICE" IS PART OF OUR CONTRACT AND MY JOB IS TO SEE THAT YOU GET THE RESULTS YOU EXPECT-
C.I.HAYES Inc.

Your Hayes equipment delivers the expected results thanks to Hayes KNOW-HOW and SERVICE.

Here are the world's finest tools for Sintering and Hardening Metal Powders

Hayes' *Know-how* and *correct furnace design* assures you —

—absolute production control over time, temperature and atmosphere in both sintering and hardening.

—highest degree of uniformity throughout the production cycle.

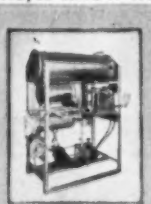
—scale-free, clean or bright sintering and hardening.

—retained properties of color and carbon content (can increase carbon content if desired).

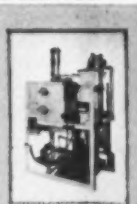
—controlled carbo-nitriding to increase resistance to wear.

Modern powder metallurgy is tremendously valuable IF you have dependable heat-treating equipment.

Have HAYES and you have the BEST



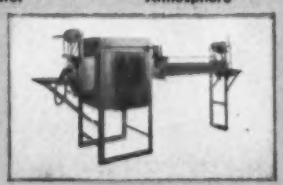
Exothermic Atmosphere Generator



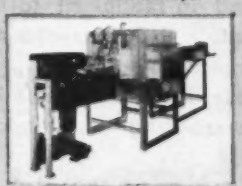
Endothermic Atmosphere Generator

Dissociated Ammonia Atmosphere

Combination Sintering and Hardening, reciprocating hearth and conveyor

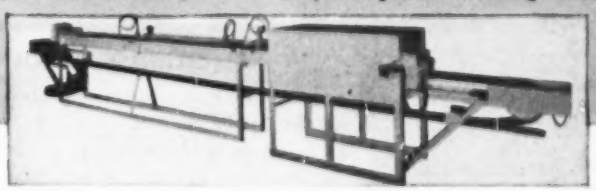


Manual Pusher Sintering



Hydraulic Pusher Sintering

Reciprocating Hearth Hardening Furnace



Conveyor Sintering

CALL OUR NEAREST REPRESENTATIVE — REQUEST LATEST CATALOG

C. I. HAYES INC. 22 BAKER ST., PROVIDENCE, R. I.

Manufacturers of Electric Furnaces Since 1905

ELECTRIC CERTAIN CURTAIN FURNACES

E. O. HESS, Room 711, 36 Journal Sq., Jersey City, New Jersey

E. P. BURKE AGENCY, Room 606, 1900 Euclid Ave., Cleveland 15, Ohio

W. G. PRAED, 416 N. State St., Chicago, Ill.

JOHN E. FIGNER CO., 1123 LeClair Ave., Regent Sq., Pittsburgh 18, Pa.

C. A. HOOKER, 202 Forest Ave., Royal Oak, Mich.

DOLAN INDUSTRIAL SALES, 5506 Lawndale Ave., Houston 23, Texas

L. WAGNER, 112 Loomer Avenue, San Jose 12, Calif.

L. J. EDWARDS, 75 Baker Street, Providence, R. I.

T. C. JARRETT, 95 So. Ammons St., Denver 15, Colorado

C. E. HOLMES, 531 No. 20th St., Birmingham, Ala.

DAY ENGINEERING CO., 27 Rittenhouse Place, Ardmore, Pa.

Minimize the hazards of line breaks...

with Celanese*

LINDOL* HF

the flame-resistant hydraulic fluid

- chemically stable
- non-volatile
- odorless
- low pour point
- non-corrosive
- excellent lubricant

Lindol HF—industry tested for over 10 years in die-casting plants across the nation—provides an extra margin of safety for operators of hydraulically-activated machines. Plant managers depend on Lindol HF to minimize fire hazards in line breaks and other mechanical failure.

Lindol HF is unaffected by customary thermal and mechanical stresses of hydraulic equipment . . . remains stable at highest temperatures . . . contains no water, inorganic salts, chlorine or additives.

For greater safety with hydraulics, transfer power with Lindol HF. Write for new information bulletin.

Celanese Corporation of America, Chemical Division, Dept. 589-I, 180 Madison Avenue, New York 16.

CELANESE LINDOL* HF

Appearance	Clear
Specific Gravity 20/20°C	1.160±.008
Boiling Range @ 10 mm. Hg. °C	255—295
Volatility, 6 hrs. @ 100°C, % max.	0.1
Flash Point, °F Tag open cup	440—465
Fire Point, °F Cleveland open cup	685
Auto Ignition Temperature, °F	over 1100
Viscosity Range, Seconds Saybolt Universal @ 25°C.	240—325
Pour Point, °C	—25 to —30
Weight, lbs/gal. @ 20°C	9.7

LINDOL HF as an additive in regular petroleum lubricants (1½% by volume), and in synthetic lubricants (5% by volume), increases film strength and lubrication value.

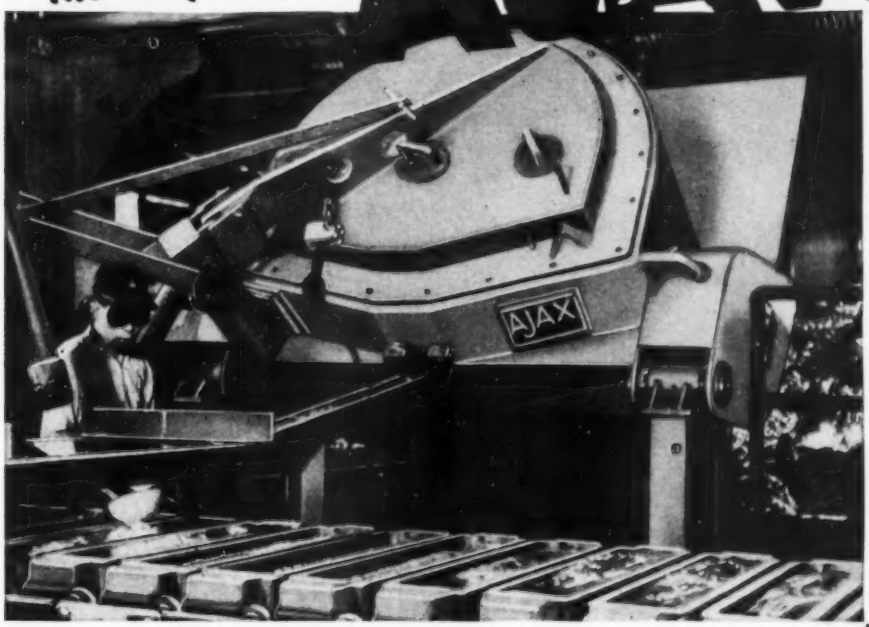
Celanese* CHEMICALS

*Reg. U. S. Pat. Off.

For additional information Circle No. 11 on the Reader Service Card

Increase your Profits—

get the highest possible recovery of aluminum scrap with the help of AJAX TAMA-WYATT *Induction Furnaces*—



AJAX induction furnaces are used in many plants for the efficient recovery of loose scrap, such as foil, chips, borings, turnings and the like. They are also adaptable for the full range of non-ferrous metals and alloys with the same advantages obtained in aluminum, and are built in sizes ranging from 20 kW to 1400 kW.

AJAX low frequency induction furnaces will melt aluminum foil scrap with the lowest obtainable melting losses. Photo above shows an AJAX 166 kW melting furnace installed at the plant of the Toyo Aluminum Works in Yao near Osaka, Japan. Unbaled foil scrap shown at right edge of photo is remelted at the rate of about 900 pounds per hour with a recovery of 99%. Molten metal is poured into ingot molds as shown in the front of the photo. Another view of same furnace is shown in small photo at right.

Send for Reprint of Article on Scrap Recovery by Induction Furnaces

AJAX ENGINEERING CORP., TRENTON 7, N. J.

AJAX TAMA-WYATT INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

For additional information Circle No. 2 on the Reader Service Card

You Don't Have To Add Skilled Manpower To Your Production Team

. . . to get die castings like these

Our engineering staff would welcome the opportunity to help you with your needs. Just drop us a line for prompt, practical assistance.

Here's basic die casting data for every engineer and designer. Write on your company letterhead for your copy.

NEWTON NEW HAVEN

THE NEWTON-NEW HAVEN COMPANY

[illegible] AVENUE WEST HAVEN 16 CONNECTICUT

For additional information Circle No. 52 on the Reader Service Card

LETTERS TO THE EDITOR

DIE CASTING SOURCE

We are writing to ask whether you could furnish us with a list of pressure die casters who are equipped to do automatic plating (chrome). We are interested in having three or four items manufactured for us. — H. L.

Relatively few contract die casting plants are equipped to do chrome plating. The majority of plated die castings are finished by the company that buys the castings. However, a list of die casting plants known to have this type of equipment has been forwarded. — Ed.

SHELL MOLD CASTINGS

We would appreciate having names of foundries using the shell molding process who would accept orders for castings in aluminum, bronze and gray iron. We would also like to have any catalogs concerning the above. — G. D. N.

On page 33 of the July issue Vol 11 No. 7 of Precision Metal Molding, there is an article regarding shell molding versus conventional sand casting, and reference is made to a concern named Production Pattern and Foundry Co.

We would be interested to know the address of this concern so that we may contact them. — W. J. B. (Plant Purchasing Agent).

Information forwarded. The number of requests for sources of shell mold castings that have been received since PMM started covering this process editorially the first of this year indicates a healthy interest on the part of designers and purchasing men in this new casting method which promises to replace many jobs now being sand cast. — Ed.

continued on page 14

Circle No. 43 on the Reader Service Card

2 first quality die steels

for every die casting need!

hotform

The famous original 5.00% chromium steel, known and used by die casters everywhere for aluminum and white-metals casting. No movement in hardening — no surface pitting — good machining qualities . . . matchless advantages for your jobs!

speed-cut

Free machining in heat-treated condition — air-hardenable to 325 Brinell — much higher when oil quenched. SPEED-CUT's remarkable properties make it your profitable choice for short-run dies, holder blocks, plastic molds and mold plates!

Upon request to our Sales Department, complete information on the composition, heat treatment and use of HOTFORM and SPEED-CUT will be furnished gladly, without obligation.

Vanadium-Alloys

STEEL COMPANY

LATROBE, PA.

COLONIAL STEEL DIVISION • ANCHOR DRAWN STEEL CO.

PUNISHMENT-ABSORBING Plaster Mold Castings

Atlantalloy #31 meets every specification to perform satisfactorily in this application.

Skirt door operating mechanism as installed on Pennsylvania Railroad cars.

Parts for railroad cars must be able to take a beating. That's why Atlantalloy #31 High Tensile Manganese Bronze is used for the skirt door operating mechanism on the Pennsylvania Railroad cars manufactured by the Budd Company.

Atlantalloy #31 is characterized by its punishment-absorbing ability. It requires no heat treatment to attain its high physical properties, having ultimate tensile of 100,000, yield point of 60,000, and Brinell hardness of 190. It has a minimum elongation of 7% in 2 inches. These properties are inherent in the as-cast condition.

The Atlantalloy plaster mold casting process turned out a rugged operating mechanism which required no machining and which could be installed simply by drilling two holes.

Atlantic's engineers will be happy to show you how Atlantalloy plaster mold casting can help solve some of your own problems. Write for a free copy of High Quality Precision Castings for Industry today!

ATLANTIC CASTING and ENGINEERING CORP.

Established 1937

810 Bloomfield Avenue • Clifton, N. J. • PRescott 9-2450

For additional information Circle No. 48 on the Reader Service Card

PIPE FITTINGS

We are interested in securing a source of supply for a standard pipe fitting made by some one of the precision metal molding processes. We would like to contact a manufacturer who has already tools and experience in the manufacture of standard pipe fittings, and we are in hope that you will be able to direct us either to the manufacturer or to an association that in turn could give us the information we desire.

More specifically, we are interested in a 90° reducing elbow 1" to ¾" standard pipe sizes. We would expect to have a yearly demand of 50,000 to 75,000 pieces. Corrosion resistance would have to be comparable to standard galvanized malleable iron fittings.

Any information which you can provide would be greatly appreciated. — R. G. F. (Vice President).

The names and addresses of several companies who manufacture pipe fittings by die casting, permanent mold casting and shell mold casting have been forwarded, although it is not known whether these companies manufacture these fittings as standard, stock items in the size requested. If any of our readers know of a standard source, we will be pleased to put them in touch with reader R. G. F. — Ed.

POWDER METAL INFORMATION

Your publication has been suggested to me as an excellent source of information dealing with the use of metal powder.

We wish to search back copies of your magazine for articles dealing with this subject, and would appreciate any information you may provide. — H. B. L.

We have had so many articles on all phases of powder metallurgy that it would be impossible to send all of them, but we have selected a representative group of articles in

continued on page 105

THE NEW JERSEY ZINC SALES COMPANY
(INCORPORATED)
CABLE ADDRESS
"JERSEZINC"
160 FRONT STREET
NEW YORK 38, N.Y.

Mr. David Laine, Secretary
American Die Casting Institute, Inc.
366 Madison Avenue
New York 17, New York

Dear Dave:

It gives me a great deal of pleasure to act as spokesman for the Horse Head family in congratulating the American Die Casting Institute on the occasion of its twenty-fifth birthday.

We feel that, during all these years, NJZ has been more than just a supplier of metal to the die casting industry. It has been our good fortune to be in a position to ease some of the industry's growing pains and to share in its successes. We are confident that the future holds great promise for even greater strides in the die casting art and we hope that we will be privileged to play an active role in tomorrow's accomplishments.

With your permission, I would like to reproduce this letter in the September issue of Precision Metal Molding magazine and, in that way, say congratulations to our many good friends in the die casting industry.

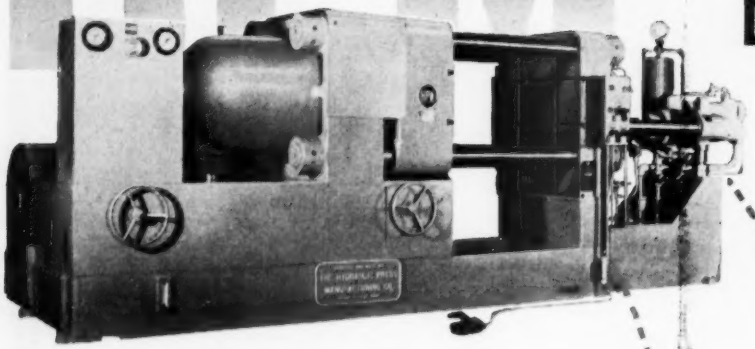
Best regards,

R. G. Kenly
Vice-President

RGK:jl

SUGGESTIONS FOR USE OF OUR PRODUCTS ARE BASED UPON TESTS BELIEVED TO BE RELIABLE. HOWEVER, WE DO NOT GUARANTEE THE RESULTS TO BE OBTAINED.

HPM

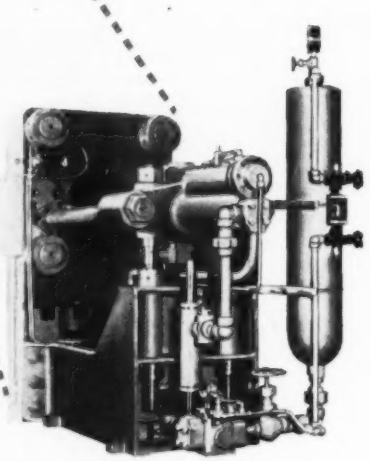


Model 400-B *Aluminum* Die Caster!

with Built-In Nitrogen Accumulator for INCREASED INJECTION SPEED!

for ALL-HYDRAULIC HIGH PRODUCTION of PRECISION PARTS . . .

- Here's a new, high-speed die casting machine for making aluminum castings up to 12 lbs. in weight. Listed below are just a few of the H-P-M design features which make this new die caster second to none:
  - High-speed plunger advance . . . up to 400 ft. per minute.
  - Positive, injection pressure build-up . . . no pre-fill valve to close.
  - Built-in hydraulic ejector saves time, greatly reduces die costs and minimizes operator fatigue.
  - Rugged straight-line "All-Hydraulic" die clamp with few moving parts, assure positive die alignment . . . die change-over is simple and fast.
  - Dual hydro-electric safety devices guard against premature injection.
  - Plenty of space around die mounting surfaces for installation of core pull cylinders.
  - Independent handwheel adjustments for both die clamp and injection pressures.



400 ft. per Minute *Injection Speed*

Write for catalog 5106-A, today.

SPECIFICATIONS MODEL 400-B					
SIZE OF DIE PLATES	SPACE BETWEEN BARS	DIE OPENS	MAXIMUM DIE SPACE	CAPACITY PER SHOT (LBS.)	NET WT. (LBS.)
38"x38"	23"x23"	16"	42"	2.2 To 12.2 (Al)*	40,500

*Note: The model 400-B handles brass and magnesium die casting as well. Complete specifications on this and model 150-A (150-Ton) machines on request.

HPM

THE HYDRAULIC PRESS MFG. CO.

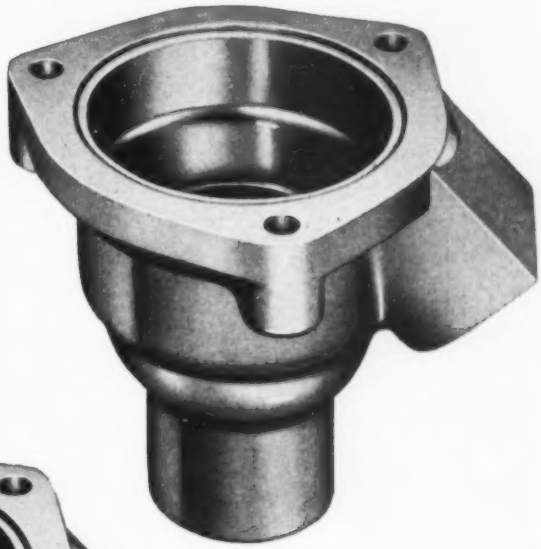
1074 Marion Road, Mount Gilead, Ohio, U. S. A.

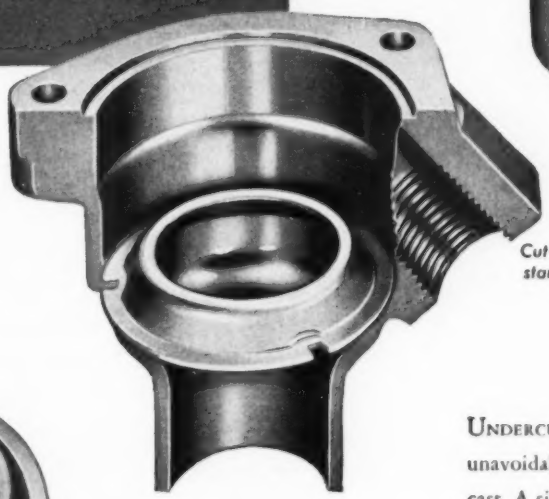
Presses For Every Pressure Processing Application

For additional information Circle No. 20 on the Reader Service Card

DESIGNING for simplified assembly

with MADISON-KIPP ZINC and ALUMINUM DIE CASTINGS





Cut-a-way view showing stamped insert in place.

Stamped insert showing notches for cast-in staking lugs.

UNDERCUTS in castings are sometimes unavoidable. They are, however, difficult to die cast. A simple, inexpensive solution is here illustrated. A steel stamping is staked in place after casting. This same idea can be used successfully not only to avoid undercuts, but also for low cost component assembly.

Madison-Kipp is skilled and seasoned in die casting mechanics and invites your inquiries for cooperative effort.

kipp

MADISON-KIPP CORPORATION
213 WAUBESA STREET, MADISON 10, WISCONSIN, U.S.A.

• Skilled in Die Casting Mechanics • Experienced in Lubrication Engineering • Originators of Really High Speed Air Tools

For additional information Circle No. 29 on the Reader Service Card

USCO K

USCO K Aluminum Alloy is one of several standard die-casting alloys of the AXS-679 Revision 3 type. USCO K and the other aluminum alloys in the K series are production controlled from raw materials to finished ingot under the most modern methods of alloying and refining—giving you the uniform mechanical and physical properties you desire in your castings. If you prefer, we can produce an aluminum die-casting alloy to your exact specifications.

The specifications on AXS-679 Revision 3 are broad. In USCO K the Si is kept at the maximum limit to insure fluidity. The detrimental elements—Mg, Fe, Ni and Cr—are kept at the low limit to combat die-cast sludge. Even the unspecified elements—Pb and Na—are kept at a trace to prevent soldering.

Our metallurgical engineers, who have a practical working knowledge of your problems, are at your service always.

For outstanding castability—maximum production economy—uniformity of analysis and performance—order USCO K!

FREE—Send for your copy of the USCO Aluminum Alloy Selector. A handy aid to analysis, specifications and many other foundry problems.

For 49 years, pioneers in aluminum development.

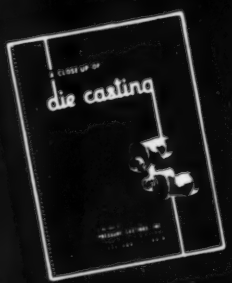
USCO **U. S. REDUCTION CO.**
East Chicago, Indiana

PLANTS: EAST CHICAGO, INDIANA • TOLEDO, OHIO

For additional information Circle No. 42 on the Reader Service Card

PCI

Many of the country's leading manufacturers continue to specify die castings by Pressure... There must be a reason!



This booklet brings our organization to you, in words and pictures, and tells how better die castings are made. Write for your copy today!

PRESSURE CASTINGS, INC.

die castings

ZINC AND ALUMINUM ALLOYS

CLEVELAND 19, OHIO

Wm. H. Thomas, Jr.
Sales Manager

Marshall P. Reis
Ass't Sales Manager

Irving L. Bambrick
Boston, Mass.
Commonwealth 6-2864

John D. Goodin
Indianapolis, Ind.
Talbot 9245

R. E. Zimmermann
Detroit, Mich.
Trinity 5-7474

J. R. Hanna
Rochester, N. Y.
Monroe 5392

Manufacturers Sales
Dayton, Ohio
Melrose 3-4902

ALDRICH PUMPS

reduce fire risk and cut hydraulic fluid costs

● *With Aldrich Pumps* . . . oil *OR* water can be used as hydraulic medium. When water is used, you get insurance against plant damage or bodily injury due to oil fire.

Also with Aldrich Pumps . . . you get these important maintenance advantages:

REDUCED SPACE REQUIREMENTS

Due to higher operating speeds, you get whatever volume and pressure you need from a smaller, lighter, more compact pump.

SECTIONALIZED FLUID-ENDS

. . . afford maximum accessibility. Parts can be replaced easily and at low cost.

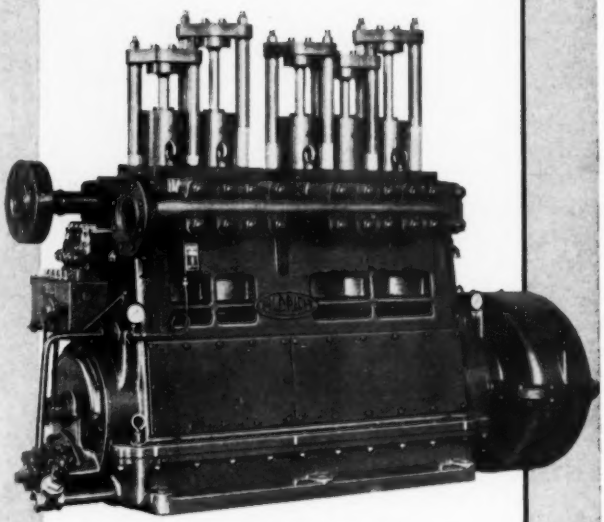
CHANGEABLE PLUNGER SIZES

In most cases plunger sizes can be changed merely by using new glands, throat bushings and packing in the same fluid-end: thus facilitating changes in pressure and volume requirements.

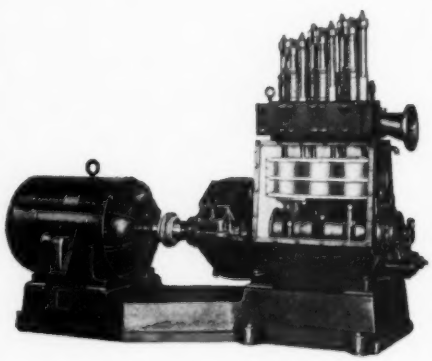
INTERCHANGEABLE WEARING PARTS

Among 3, 5, 7 and 9 plunger units all wearing parts are interchangeable. This is particularly advantageous where a combination of multiplex pumps is required, for it reduces spare parts, costs and inventories.

. . . Aldrich Direct Flow Pumps have given many years of satisfactory service to die casting manufacturers. Units are manufactured in 3″, 5″ and 6″ stroke sizes, in Triplex, Quintuplex or Septuplex models (50 to 900 hp).



Aldrich Direct Flow 5″ Stroke Quintuplex Pump. 150 hp.



Aldrich Direct Flow 5″ Stroke Triplex Pump. 100 hp.

Write us for catalogs, engineering service, or a representative's call. We invite your inquiries for pumps or complete central hydraulic systems.

THE ALDRICH PUMP COMPANY

25 PINE STREET • ALLENTOWN, PENNSYLVANIA

. . . Originators of the Direct Flow Pump

Representatives: Birmingham • Bolivar, N. Y. • Boston • Buffalo • Chicago • Cincinnati • Cleveland • Denver • Detroit • Duluth • Houston • Jacksonville • Los Angeles • New York • Omaha • Philadelphia • Pittsburgh • Portland, Ore. • Richmond, Va. • St. Louis • San Francisco • Seattle • Spokane, Wash. • Syracuse • Tulsa

For additional information Circle No. 8 on the Reader Service Card

Aircraft engine heat deflector

Cream separator bowl base

...stainless castings cut costs

Considerable savings in both material and machining time are effected when Crucible Stainless Steel Sand Castings are used. And here are two good examples.

The heat deflector — which protects vital turbine assembly parts in an advanced model aircraft engine — was cast by Crucible from AMS-5363A (Type 347) stainless . . . in conformance with rigid aircraft quality standards. Previously this part had been completely machined from a solid forging. The cast part performs the same job, but at a substantial saving in manufacturing cost.

The bowl base for a dairy cream separator was cast by Crucible from CF-20 (Type 302) stainless. To permit fast and efficient finishing in automatic machine tools, the casting must be held to close tolerances. Also, it has to be free from porosity, shrinkage, gas holes, inclusions or any defects that in the finished part would interfere with cleanliness or violate food laws.

Both the heat deflector and the bowl base applications exemplify how steel and machining time may be saved by using a stainless steel casting instead of machining from bar stock or a forging. If you make a product that must resist corrosion, consult Crucible regarding the advantages of producing it from a stainless sand casting.

CRUCIBLE first name in special purpose steels

53 years of Fine steelmaking

STAINLESS CASTINGS

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

For additional information Circle No. 13 on the Reader Service Card

DIE CASTERS LOVE IT!

And here's why . . . . . Die Slick prevents sticking, scoring, and soldering. It will not stain castings or injure plating quality. Die Slick improves metal flow and enables better fill-out of the casting. Die Slick causes no undesirable fumes, is non-toxic, simple to apply with brush or blow pipe, and is extremely economical to use. Five grades for all needs in casting aluminum, magnesium, brass, lead or zinc alloys.

. . . and they love **PLUNGER SLICK** *too!*

because it is a specialized compound for cold chamber machines. Plunger Slick prevents galling or sticking of plungers, does not melt off, allows 5 to 7 more casting shots per application, is non-staining, and protects plunger and cylinder from "eating" effects of molten metal.

What alloys are you casting? We will send a gallon of the proper Die Slick grade or of Plunger Slick for production tryout. The invoice will be cancelled if performance is not satisfactory. But, write today!

start every job with **DIE SLICK**

used by die casters everywhere

G. W. SMITH & SONS, INC., 5403 KEMP ROAD, DAYTON, OHIO

For additional information Circle No. 53 on the Reader Service Card

Between the Lines

in this and future issues of PMM

— THE TECHNICAL LITERATURE contains little specific reference to die castings in the low temperature alloys, tin and lead, yet these metals are in common usage for an amazingly wide variety of parts. PMM presents an article beginning on page 58, giving tabulated physical specs and design data.

— MECHANICAL FINISHING systems are used on the vast majority of die castings, either as a preparation and surface conditioner, or as a final treatment. Reports on two unusual mechanical finishing methods are contained in the special Finishing Section of this issue.

— POLISHING ZINC die cast window frames calls for some clever tooling to avoid manual operations. Detailed description of the fixture begins on page 73.

— BARREL POLISHING of large, intricately shaped aluminum die castings by racking the castings in a special type of barrel is the subject of another article on page 79.

— WHAT CAN AN INSTITUTE DO to help the industry it represents? There are many concrete examples of this in the 25 year record of the American Die Casting Institute, whose accomplishment the editors of PMM salute in this special issue.

No Problem's Too Tough

when you call in ... PRECISION

Complicated CORING

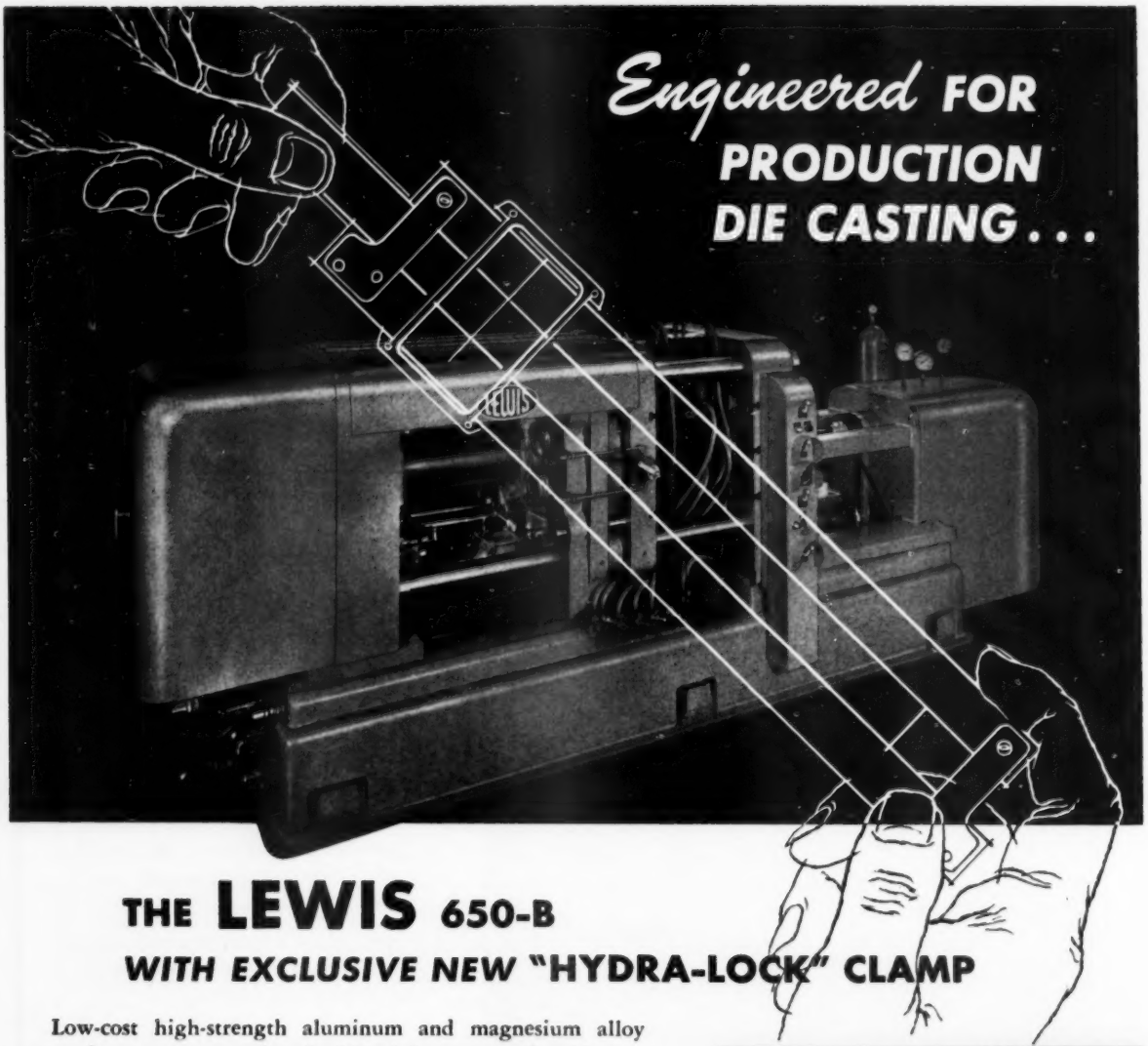
Precision's ability to produce die castings involving complicated coring offers you these advantages:

1. Reduces subsequent machining operations.
2. Combines several parts into one die casting, eliminating assembly operations.
3. Makes possible quantity production of intricate parts at much lower cost than by other casting methods.

Since 1909 the name "PRECISION" has been the symbol of highest quality in the die casting industry.

PRECISION CASTINGS CO., Inc.
212 Walnut St., Fayetteville, N. Y.
Syracuse, N. Y. · Cleveland, O. · Chicago, Ill.
Kalamazoo, Mich. · Cortland, N. Y.
British Affiliation — Wolverhampton Die Casting Co., Wolverhampton, England

For additional information Circle No. 34 on the Reader Service Card



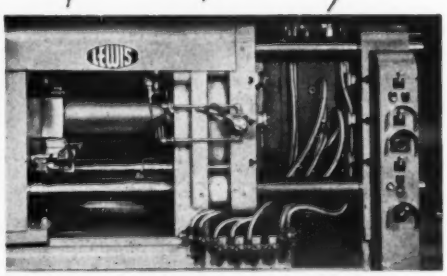
THE LEWIS 650-B

WITH EXCLUSIVE NEW "HYDRA-LOCK" CLAMP

Low-cost high-strength aluminum and magnesium alloy castings are mass produced with minimum scrap by this new LEWIS machine. Featuring rapid 2-stage injection with pressures up to 100,000 pounds . . . a 650-ton hydraulic clamp . . . large platens . . . faster, easier die setting . . . finger-tip controls . . . and a remote power source for flexibility of installation, the Model 650-B brings new concepts of economy, safety, speed and quality to the die casting industry.

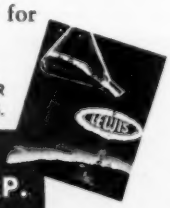
The powerful "HYDRA-LOCK" clamp assures maximum safety. Its design also provides a ball-and-socket action that compensates for misalignment of die faces within reasonable limits.

For profitable production of accurate, flawless, high tensile castings . . . specify the LEWIS 650-B! It has no equal for economy . . . safety . . . quality.



"HYDRA-LOCK" clamp in closed position. A sliding block automatically moves into position behind strut to assure full locking pressures for clamping mechanism.

WRITE FOR BULLETIN 103 FOR DETAILS AND SPECIFICATIONS.



LEWIS WELDING & ENGINEERING CORP.

63 INTERSTATE STREET BEDFORD, OHIO

1407-LW

DISTRIBUTORS

KORDENBROCK MACHINERY CO.
Detroit

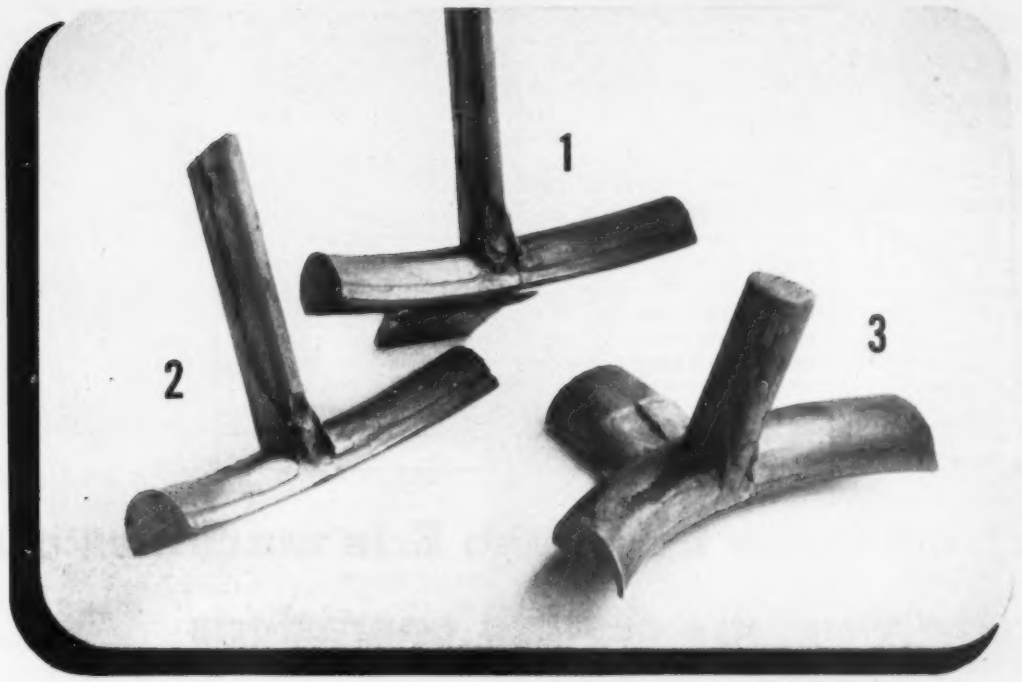
NEFF, KOHLBUSCH & BISSELL
Chicago

MOORE MACHINERY COMPANY
Los Angeles San Francisco
San Jose

For additional information Circle No. 27 on the Reader Service Card

NO WELD FOR DIE CASTERS

NO WELD.. THE LUBRICANT CONCENTRATE FOR DIE CASTING ALUMINUM - MAGNESIUM • ZINC



NO WELD was used to "shoot out" the "weld" that caused flaws in the castings pictured above. The "weld" could have been prevented in the first place if the die caster had started the job with NO WELD.

Casting No. 1 was "welded" to the core. When it was forcibly removed from the core, the "welded" portion was torn from the casting and remained firmly attached to the core.

Casting No. 2 shows an intermediate stage in the "shooting out" of the "weld." The die was run hot with liberal amounts of straight NO WELD. The NO WELD has partially penetrated between the "weld" and the core, and has also acted as a flux so that the fresh hot metal has picked up the loosened portion of the "weld".

Casting No. 3 shows the final stage in "shooting out" the "weld." NO WELD has completely penetrated between the "weld" and the core, and the new casting has picked up the remaining slug of metal. Alloy is No. 13.

E. M. Scott Chemical Company developed NO WELD to prevent "welds" in the die casting of aluminum — but it has also performed spectacularly in the manner pictured above. More and more die casters are finding NO WELD outstanding for magnesium and zinc — yes, even parts to be plated.

Send for a free sample today and see how NO WELD can raise your standards of production, quality and economy.

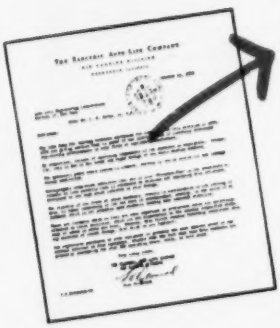
E. M. SCOTT Chemical Company • 241 West Jefferson Blvd. Los Angeles 7, California

For additional information Circle No. 37 on the Reader Service Card

DIE CASTERS

Here's an *important* message for you from

THE ELECTRIC AUTO-LITE COMPANY read it for yourself...



Gentlemen:

The Lake Erie Die Casting Machines purchased for operation at this division of AUTO-LITE are giving service that is proof of the incorporation of carefully developed engineering advancements in this field of equipment manufacture.

By comparison, failure of operating components of the machines is negligible. Primarily, this is due to the sound and rigid design of the basic machine members.

The hydraulic panel board system is compact, valving is easily accessible and leakage easily controlled.

Radiographic inspection indicates that use of your "Pressure-Pac" in the construction, results in less porosity than is evidenced by machines not employing this principle, developed to the high point achieved in your design.

The rigidity of your frame of these machines, results in acceleration of the setting of dies, as equal tensioning of the tie bars is accomplished, usually, in one cycle of adjustment which is not possible upon machines lacking this inherent stability.

These are features which we feel are very important as production rates are materially affected by these qualities, which are not discernible in the usually simplified statement of speed in shots per hour...

Our repetitive purchases of your equipment is probably the most sincere proof of our current interest in your equipment, coupled with the fact that Lake Erie machines are presently accounting for over 300 operating hours, daily in this plant.

F. H. Drummond
Vice-President

Carefully developed Engineering advancements

Sound, rigid design

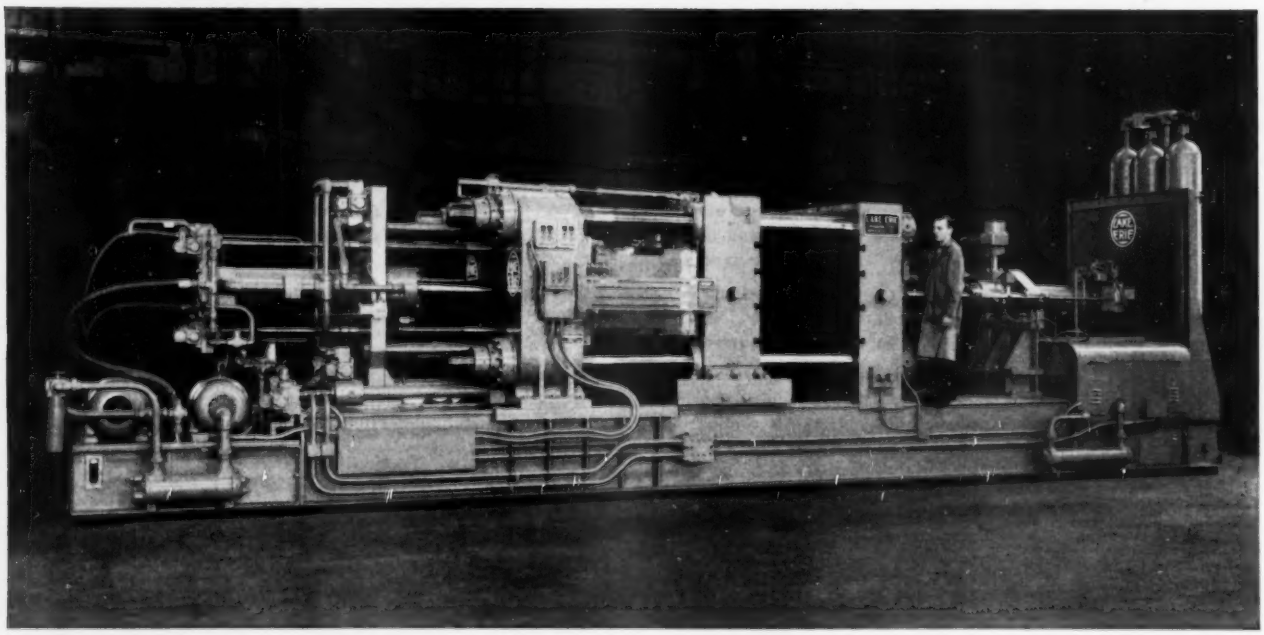
Less porosity with "Pressure-Pac"

Dies set in one cycle

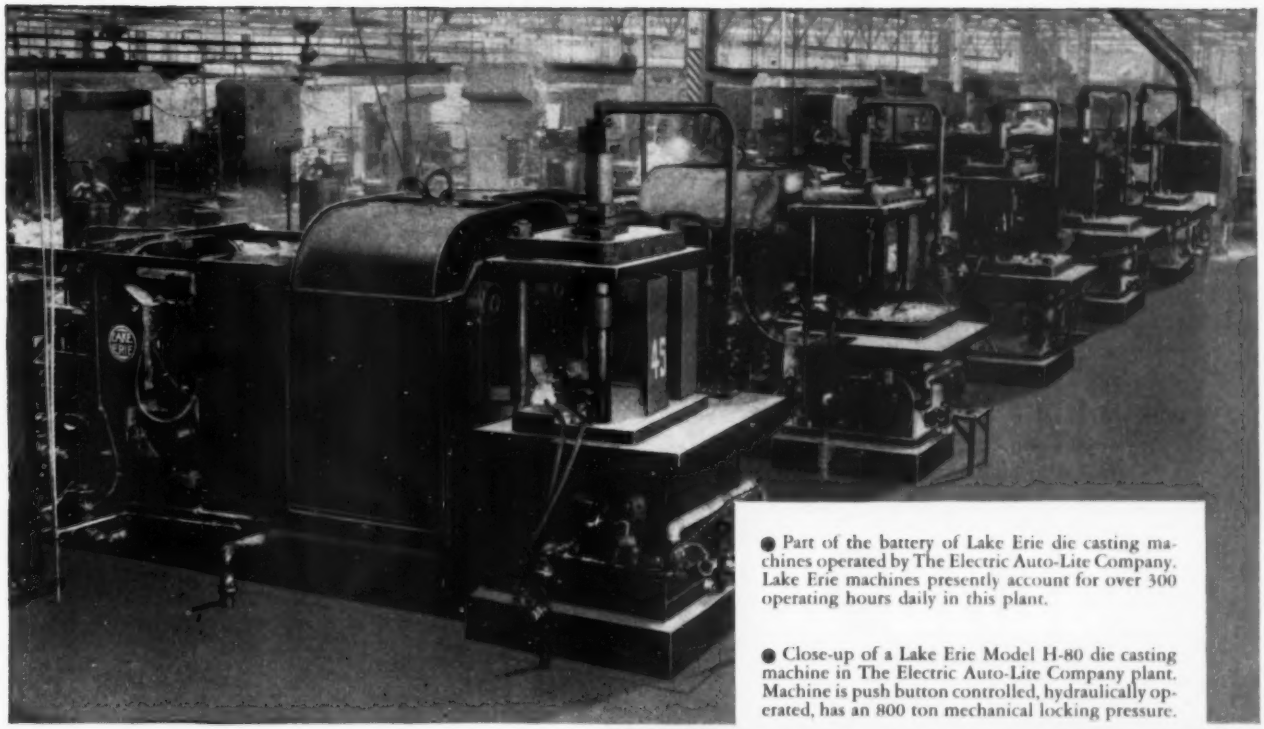
Production rates materially affected

REPETITIVE PURCHASES PROOF OF EQUIPMENT

...evidence that Lake Erie machines can improve your die casting operations



●Lake Erie Die Casting Machines are available in 10 models, ranging in capacity from 100 to 1000 tons for casting all the usual non-ferrous metals and alloys. Illustrated is new 1000 ton model.



● Part of the battery of Lake Erie die casting machines operated by The Electric Auto-Lite Company. Lake Erie machines presently account for over 300 operating hours daily in this plant.

● Close-up of a Lake Erie Model H-80 die casting machine in The Electric Auto-Lite Company plant. Machine is push button controlled, hydraulically operated, has an 800 ton mechanical locking pressure.

THE LAKE ERIE DIE CASTING MACHINES referred to by The Electric Auto-Lite Company have features long desired but never before available in die casting equipment. In addition to the patented "Wedge Cam Toggle" and "Pressure-Pac" injection unit, they have many other mechanical improvements that put this equipment strictly in a class by itself. These advantages are not restricted in use to The Electric Auto-Lite Company. Other Lake Erie customers are enjoying them and you can too. Write or call us today to discuss improved equipment for your plant.

Write for this Catalog

Illustrations, specifications, application data—all are here in complete detail with full explanation of the patented "Wedge Cam Toggle" and "Pressure-Pac" production advantages.

AMONG COMPANIES PURCHASING THIS EQUIPMENT SINCE ITS INTRODUCTION IN 1952

The Electric Auto-Lite Co.
Bendix Aviation Corp.
Bohn Aluminum & Brass Corp.
General Electric Co.
McCulloch Motors Corp.
Johnson Motors
The Dow Chemical Co.
Allis-Chalmers Mfg. Co.
Westinghouse Electric Corporation
Central Die Casting & Mfg. Co., Inc.

LAKE ERIE
ENGINEERING CORP.
BUFFALO, N.Y. U.S.A.

LAKE ERIE ENGINEERING CORP.

General Offices and Plant
520 Woodward Ave., Buffalo 17, N. Y.

District Offices in NEW YORK • CHICAGO • DETROIT • PITTSBURGH

Representatives in Other U. S. Cities and Foreign Countries
Manufactured in Canada by: CANADA IRON FOUNDRIES LIMITED

HYDRAULIC PRESSES • DIE CASTING MACHINES
ROLLING MILL AUXILIARY EQUIPMENT

LAKE ERIE ®

For additional information Circle No. 25 on the Reader Service Card

for Quality Production

AMERICAN ELECTROLYTIC

99.99+% SLAB ZINC

A reliable source for die casting requirements

AMERICAN ZINC SALES COMPANY

Distributors for

American Zinc, Lead & Smelting Company

Columbus, Ohio • Chicago • St. Louis • New York

For additional information Circle No. 4 on the Reader Service Card

a new era in PRECISION

FROM PRINT TO PRODUCT . . .

Modern trends are the guideposts of American industry. Today, the pulse of industry points to ALUMINUM . . . and for good reason! Aluminum is as strong, yet lighter; resists rust and corrosion; is easily fabricated; gives added sales appeal and, as a result, is more economical.

Kiowa Corporation has anticipated this great demand for aluminum! With the extension of our PRESSURE DIE CASTING service, Kiowa's casting facilities are now built around America's most popular metal—"ALUMINUM". This enables Kiowa to serve a much broader range of industries!

Regardless of size, you can put aluminum castings to profitable use in your products. And when you think of aluminum, think of KIOWA!

• Aluminum and Zinc Base Die Castings • Aluminum Sand Castings • Aluminum Gravity Die Castings

OVER A QUARTER CENTURY IN CASTINGS

KIOWA CORPORATION

MARSHALLTOWN, IOWA

For additional information Circle No. 33 on the Reader Service Card

ATTENTION!

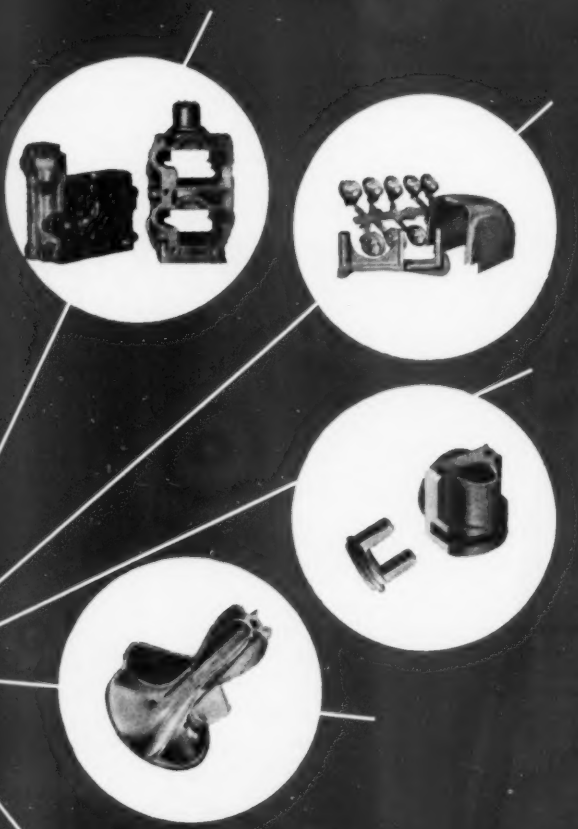
Producers of non-ferrous

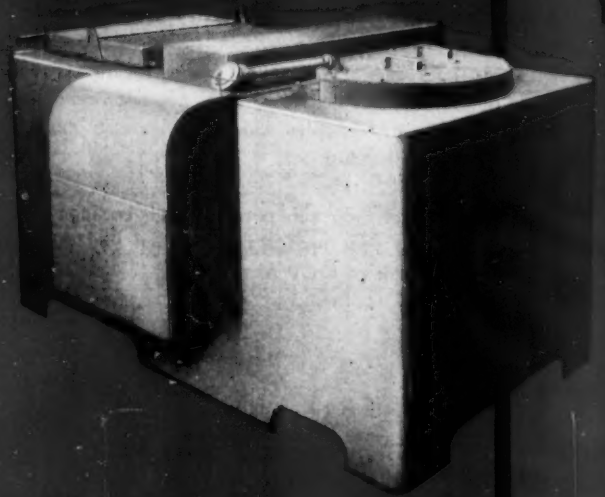
..die castings

..permanent mold castings

..sand castings

..centrifugal castings





For additional information ask for bulletin 560.

You'll get even better castings if you melt with a

LINDBERG-Fisher

2-CHAMBER MELTING FURNACE

You'll increase production. You'll reduce rejects. You'll improve working conditions. The famous Lindberg-Fisher 2-chamber construction does the trick.

Two-chamber construction gives you cleaner molten metal. Residue and impurities remain in the charging chamber . . and only the clean, residue-free metal passes to the ladling chamber.

Two-chamber construction permits continuous ladling. Cold metal can be added to the charging chamber without affecting temperature of ladling chamber within operating limits of the furnace.

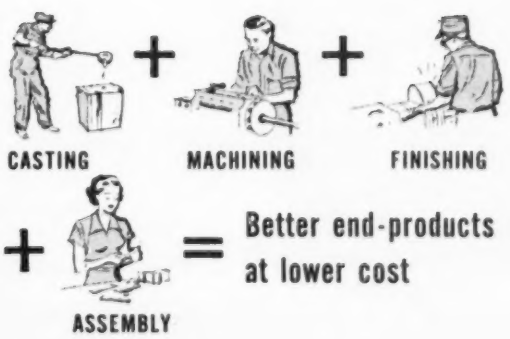
Two-chamber construction permits cooler operation. Induction heating heats only the metal, not the entire furnace. There are no flames—no products of combustion. Only a comparatively small area of molten metal is exposed to operator.

LINDBERG-Fisher MELTING FURNACES

A Division of Lindberg Engineering Company • 2450 West Hubbard Street • Chicago 12, Illinois

"Unified Production Formula:"

"Unified Production" is Monarch's unique contribution to the casting industry... UPF* provides wide experience and facilities for solving intricate casting problems. Undivided responsibility—from drawing board to finished castings or assembly—assuring closer control of quality, costs and scheduling. Any way you look at it, it pays to investigate UPF*. Write for Monarch's "Fact-File."



Better end-products at lower cost

MONARCH ALUMINUM MFG. COMPANY

DETROIT AVENUE AT WEST 93rd STREET, CLEVELAND 2, OHIO

ALUMINUM Permanent Mold Castings • ZINC Die Castings • ALUMINUM Die Castings • MACHINING • FINISHING • ASSEMBLY

For additional information Circle No. 30 on the Reader Service Card

Circle No. 28 on the Reader Service Card

The new North American
FJ-2 carrier-based jet fighter

and when you think of Die Castings THINK OF

Production Teamwork puts the NAVY FURY in the Air!

AMONG the many specialists supplying component parts for the Navy's new "Fury" Jet Fighter is Parker White Metal Company. Parker Die Castings are used on the upper fuselage door access assembly, fuselage cooling duct system, fuel system, air fuel locks, air valves on intake ram, surface control system and as components of the highly classified gun-camera. Parker Die Castings are economical, strong and light weight. Machining is virtually eliminated, thus reducing costs. You will find Parker Die Castings highly practical from your point of view. Consult with Parker engineers on your next die casting requirements. Nearly a half century of experience is yours for the asking.

Parker White-Metal Company • 2153 McKinley Ave., Erie, Pa.

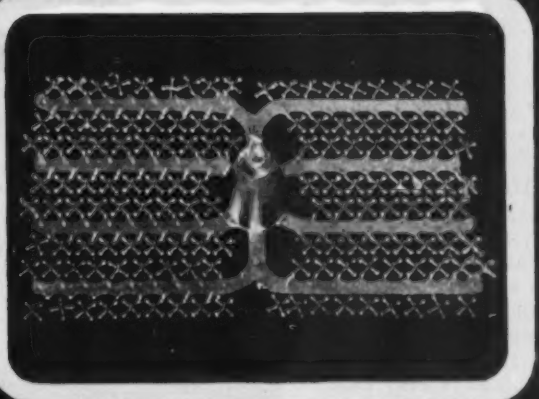
PARKER ALUMINUM and ZINC Die Castings

For additional information Circle No. 33 on the Reader Service Card

Circle No. 1 on the Reader Service Card →

telling the story of 'dag' dispersions

Want to Eliminate Sticking in the Die? Try This!



Try a 'dag' colloidal graphite dispersion as a die lubricant. Here's why it's good.

It's more slippery than almost anything . . . wholly unaffected by heat up to 750°F. You can spray it on, paint it on, or apply it by dipping.

Dies so treated take on a *dry lubricating film* that eliminates sticking, improves finish, and reduces carbon build-up in die impressions.

Lubricates ejector pins and plungers, too, so they don't stick or jam. Try a 'dag' dispersion now.

More details are yours by asking for Reprint DC and Bulletin No. 426-30J

* * *

Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of vehicles.

dag DISPERSIONS

Acheson Colloids Company, Port Huron, Mich.
... also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND
Units of Acheson Industries, Inc.

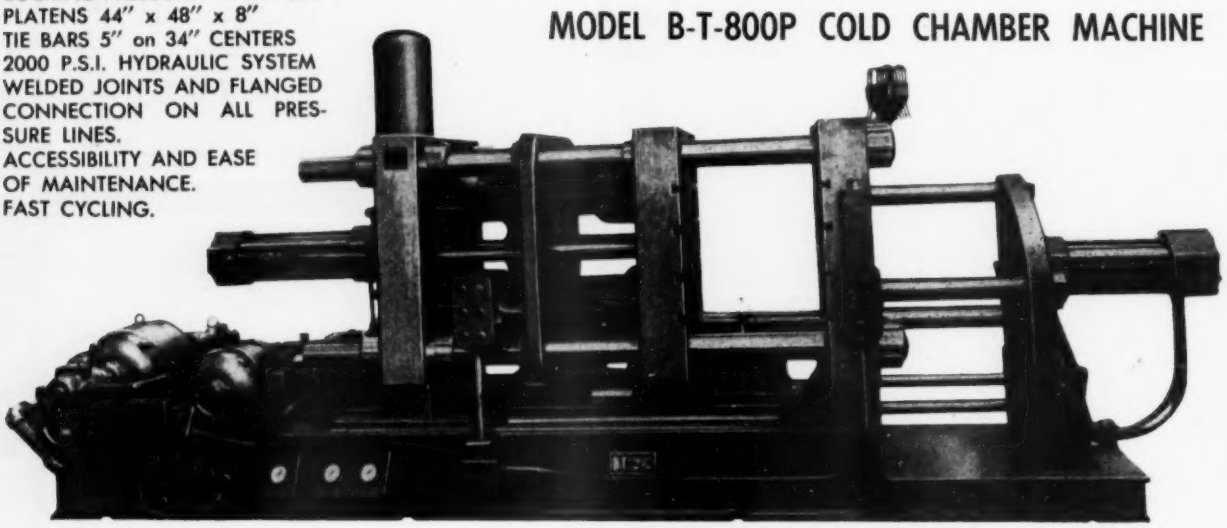
try resin-bonded dry graphite films for permanent lubrication

B&T DIE CASTING MACHINES

Designed and Built By Practical Die Cast Men, With A Life Time Experience in the Operation, Design And Construction Of Die Casting Machines

FEATURING:
LOCKING PRESSURE — 750 TONS
PLATENS 44" x 48" x 8"
TIE BARS 5" on 34" CENTERS
2000 P.S.I. HYDRAULIC SYSTEM
WELDED JOINTS AND FLANGED CONNECTION ON ALL PRESSURE LINES.
ACCESSIBILITY AND EASE OF MAINTENANCE.
FAST CYCLING.

MODEL B-T-800P COLD CHAMBER MACHINE



CHOICE OF NINE (9) MODELS FROM 150 TO 750 TONS.
AVAILABLE FOR ZINC, ALUMINUM, MAGNESIUM AND BRASS.

Write Or Call For Complete Details

B & T ENGINEERING and SALES CO.

112 MADISON AVENUE • DETROIT 26, MICHIGAN • WO. 5-3140

For additional information Circle No. 9 on the Reader Service Card

Circle No. 39 on the Reader Service Card →

put 43 years of experience to work for you...

DIE CASTINGS BY STEWART

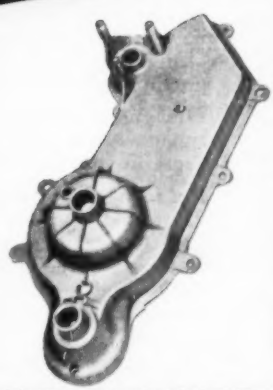
Services Available

Designing • Engineering

Die Making • Metallurgical Control

Most Modern Die Casting Equipment

Complete Machining, Polishing and Assembly Facilities

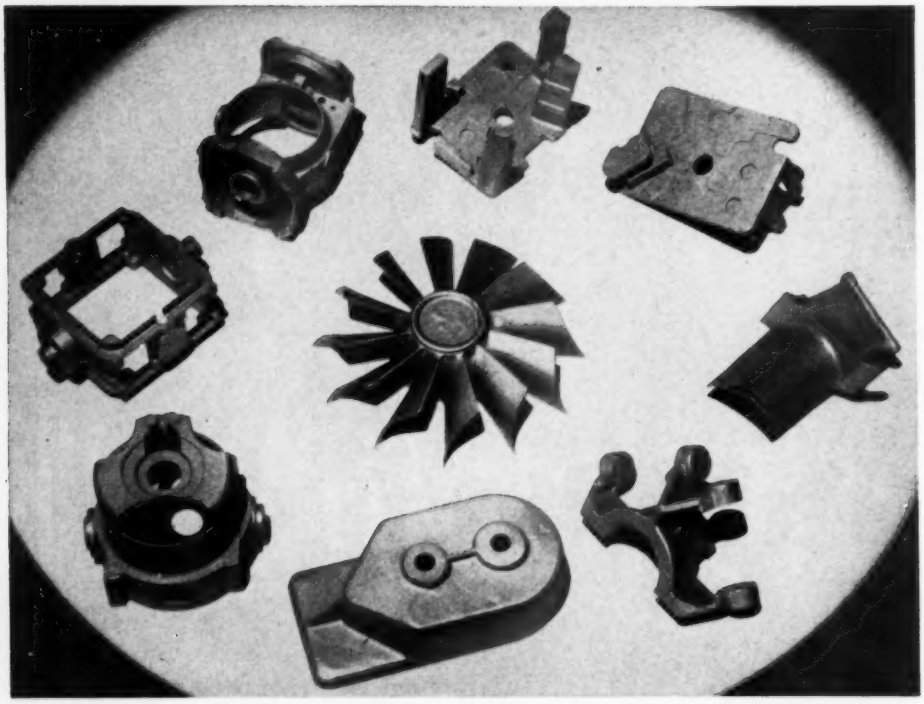


...for maximum strength, greater wear resistance, and ease of machining.

Stewart DIE CASTING

A DIVISION OF... STEWART SW WARNER

CHICAGO, ILL., 4535 FULLERTON AVE....BRIDGEPORT, CONN., 275 WARREN ST.



From a production man's nightmare to a designer's dream

... Perhaps Precision Investment Casting can make this difference for you, too

Someone used to lose sleep over each one of these parts!

For each design presented the problem of producing the part at a practical cost in spite of intricate shapes, close tolerances, hard or impossible to machine metals and costly alloys.

That's where Inco Precision Investment Casting came into the picture . . .

Take a look at these parts — some of the latest cast by Inco. They represent some of the most intricate precision parts ever cast commercially in high melting point alloys.

SOME ALLOYS PRECISION CAST BY INCO

Nickel-Base Alloys
Ferrous Alloys
Austenitic Stainless Steels
Martensitic Stainless Steels
Ferritic Stainless Steels
Carbon Steels
Alloy Steels
Tool Steels
Cobalt-Base Alloys
Special Alloys

Thin vanes, wing sections, slots, thick sections adjacent to thin sections, airfoil sections, irregular internal sections, tiny holes, concentric bosses on the centerline, widely separated thin sections which must be parallel, twelve perfect blades cast on a single hub — any one of these could give production a nightmare.

(Imagine the havoc a production run of any one of these parts would cause in your machine shop!)

But Inco's Precision Casting Foundry found a practical solution to each one of these problems, just as they may be able to solve the problem of producing some small part that's been giving you trouble recently.

Frequently, Inco precision castings not only cut production costs but at the same time open up greater design possibilities.

Precision castings may save as much as 60 percent of production costs. Make possible the use of extremely hard metals. Reduce machine shop bottlenecks. Lead to economies through re-design. Reduce metal scrap. Often permit the use of a higher alloy which otherwise would be too costly.

Whenever you have a part which is 6 inches x 5 inches or smaller, weighs under 3 lbs., requires starting tolerances as close as plus or minus .005 inches per linear inch, and needs 5 or more fabrication steps, there is a good chance you can cut costs by having it precision cast.

For more information, write for a free copy of "A Machinist's Nightmare Becomes a Designer's Dream."

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO TRADE MARK

Inco Castings • PRECISION, SAND, CENTRIFUGAL

For additional information Circle No. 21 on the Reader Service Card

—batch to batch uniformity that makes inspection unnecessary

We have used every type of G A & F Carbonyl Iron Powder thus far produced. The overall quality and batch-to-batch uniformity of your products have always been gratifying to us. Because of this product dependability, we feel that incoming inspection of your powders is unnecessary.

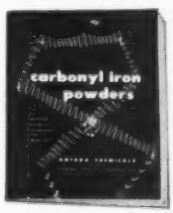
Richard D. Ponemon

President
Pyroferric Company, Inc.
621 East 216th Street
New York 67, N. Y.

G A & F Carbonyl Iron Powders are used to produce cores for transformer and inductor coils—to increase Q values, to vary coil inductances, to reduce the size of coils, to confine stray fields and to increase transformer coupling factors.

These powders are microscopic, almost perfect spheres of extremely pure iron. They are today produced in eight carefully controlled types, ranging in average particle-size from three to twenty microns in diameter. The Carbonyl Process assures the quality and uniformity of each type.

We urge you to ask your core maker, your coil winder, your industrial designer, how G A & F Carbonyl Iron Powders can increase the efficiency and performance of the equipment or product you make, while reducing both the cost and the weight. We also invite inquiries for powders whose performance characteristics are different from those exhibited by any of our existing types.



This 32-page book offers you the most comprehensive treatment yet given to the characteristics and applications of G A & F Carbonyl Iron Powders. 80% of the story is told with photomicrographs, diagrams, performance charts and tables. For your copy—without obligation—kindly address Department 57.

GA&F® CARBONYL IRON POWDERS

MEMBER mpa METAL POWDER ASSOCIATION

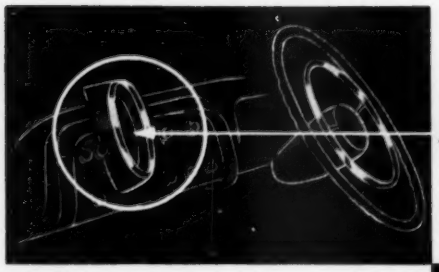
ANTARA® CHEMICALS

gdc ANTARA

Division of GENERAL DYESTUFF CORPORATION

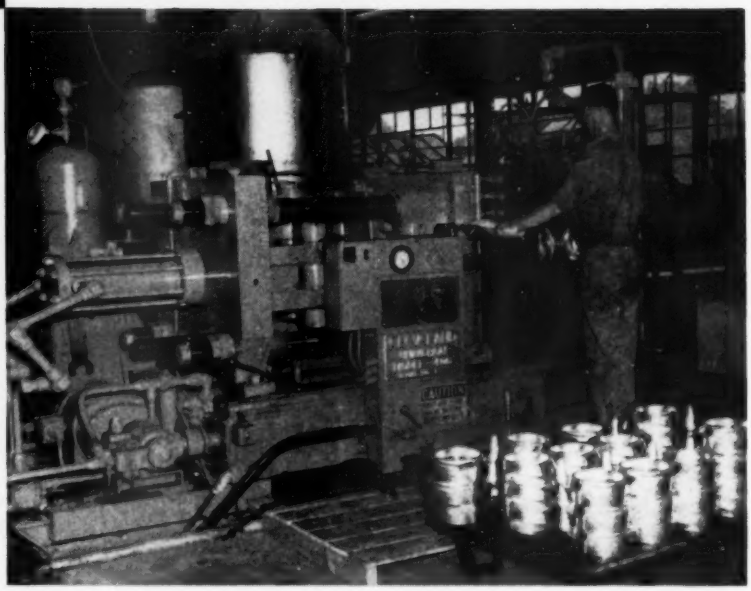
435 HUDSON STREET • NEW YORK 14, NEW YORK

For additional information Circle No. 5 on the Reader Service Card



426 MPH*

in a CLEVELAND die casting machine!



* That's the actual figure, but the abbreviation stands for units *made* per hour — in the Cleveland Die Casting Machine shown at right. Working in the ultra-efficient King-Seeley plant at Scio, Michigan, this Cleveland machine is speeding production of automobile dashboard instrument parts. The part being produced, an instrument cluster housing, is shown below, "as cast."

King-Seeley uses zinc die castings extensively for such parts as the horn ring shown below; housings for telegages (water temperature, fuel level and oil pressure); bezels; small intricate frames; and speedometer and gauge components. Chances are your car has several King-Seeley products in it.

King-Seeley Corporation, leading supplier of dashboard instruments to major automobile manufacturers, is widely known for excellence of product design and construction; for high efficiency in manufacturing methods. To maintain critical standards in its die casting department, King-Seeley relies on a Model 400 Cleveland to produce top quality castings at high speeds.

Typical of the parts produced on this Cleveland machine is the instrument cluster housing shown above. Approximately six pounds of zinc alloy are injected into the die, producing two parts per shot. The Cleveland's powerful die locking pressure and high injection speed produce sound, dense, *"hardware finish"* castings. Dimensions are held to close tolerances. Secondary drilling operations on the part have been eliminated by precision coring of 13 holes. Production averages 213 shots—426 parts —made per hour.

To get the *most* from *your* die casting department—in speed of production and quality of casting—profit from the experience of leading die casters and investigate the advantages of the Model 400 Cleveland. Your inquiries will receive prompt attention. For machine specifications, write for free copy of bulletin.

THE CLEVELAND AUTOMATIC MACHINE COMPANY

4952 Beech Street
Cincinnati 12, Ohio
SALES OFFICES: CHICAGO
CLEVELAND • DETROIT
HARTFORD • S. ORANGE

Manufacturers of a Complete Line of Spindle Automatic-Screw Machines and High Pressure Hydraulic Die Casting Machines

For additional information Circle No. 12 on the Reader Service Card

DIE CASTING-

"So light, you can carry it like a book"

CASE HISTORIES FROM MT. VERNON FILES

—and "so sturdy, that it can take the toughest daily desk use and maintain top-level performance."

That's how Edison sums up its ultra-modern, individual dictating instrument, the "V.P."

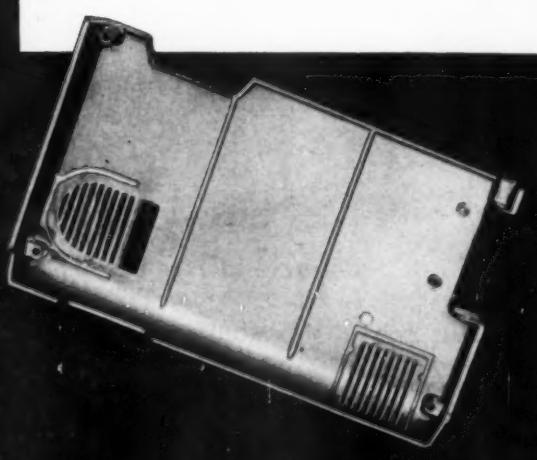
Small compact, soundly engineered and outstandingly handsome, this pint-sized prodigy provides an important aid for those engaged in business, science, education, and other fields.

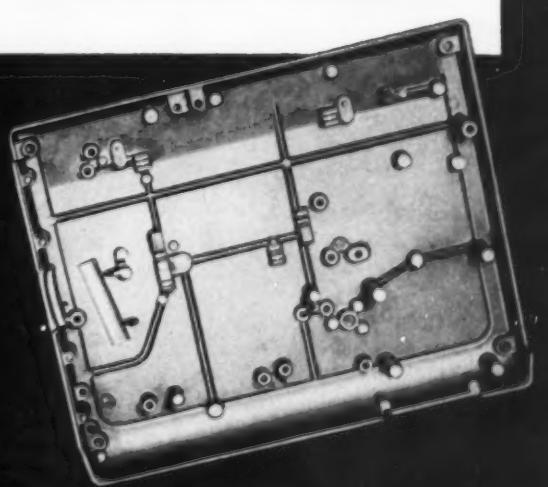
Says the Director of Engineering for the Ediphone Division: "The development and design of this new concept in dictating machines, resulting in the smallest and lightest produced, was possible only thru the use of many die castings. Their high strength-to-weight ratio; great flexibility of shape, permitting maximum utilization of space; inherent reproducibility; and low cost, *cannot be matched by any other* structural means."

This is die casting proving itself in action!—this is die casting stating its own case in the most convincing fashion. We can add nothing—except, perhaps, to say that the die castings for Edison's new "V.P." were made by us, at Mount Vernon.

It's very possible we can help you, also, to design and manufacture a product of exceptional merit at moderate cost.

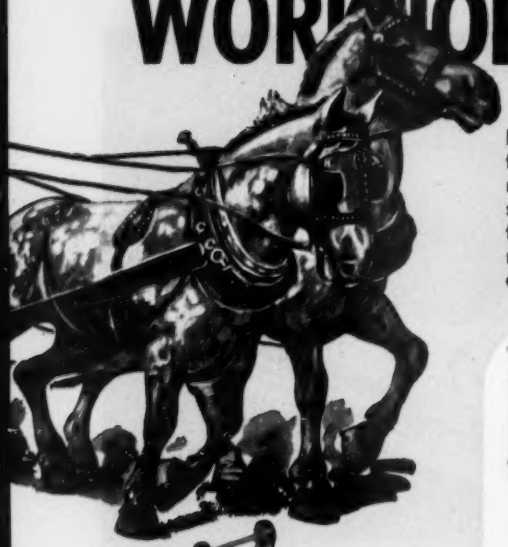
MT. VERNON
DIE CASTING CORP.
MT VERNON NEW YORK



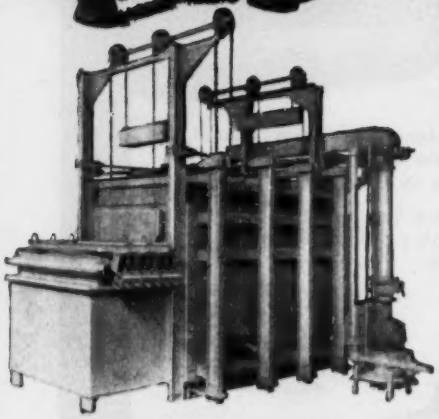


Circle No. 31 on the Reader Service Card

WORKHORSES for ALUMINUM

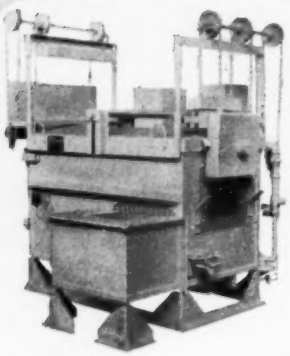


Here are the furnaces that bear the brunt of the burden in the aluminum foundry industry. They are designed for production of unsurpassed quality metal, in the fastest, most efficient and economical manner. Each has its specific purpose and capacity, meeting the exacting demands of sand foundries, die casters, permanent mold plants and smelters. They are recognized as the finest in the industry, reduce costs and make working conditions most agreeable. All furnaces may be fired by either gas or oil.



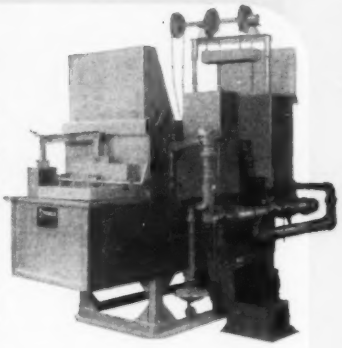
SMELTERS FURNACE

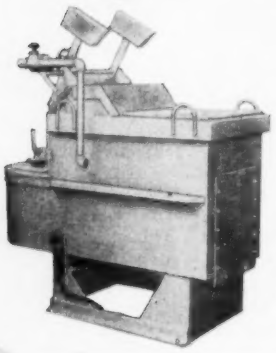
Built especially for smelters and other large melters. Easy charging, dressing, fluxing and alloying. Can be built to your own specifications. Capacities from 3000 lbs. Aluminum up.



MODEL "DC" FURNACE

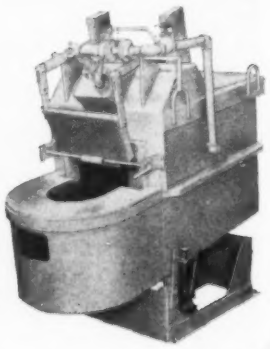
The 2 in 1 furnace. Breakdown and Holding in the same unit. Cold metal never reaches the molten bath. Assures metal of the finest quality on all classes of work. Close temperature control. Can be used as a sweat furnace for reclaiming inserts. Ideal for all types of plants including sand, permanent mold and die casting. Capacities from 350 lbs. Aluminum up.

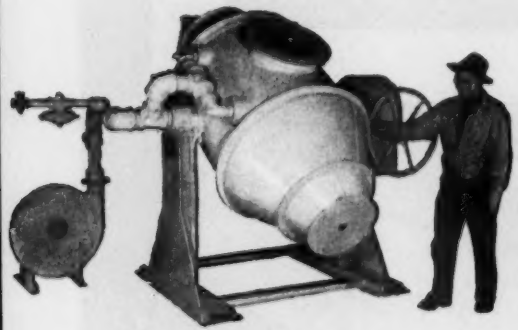




MODEL "DSC" DIE CASTING FURNACE

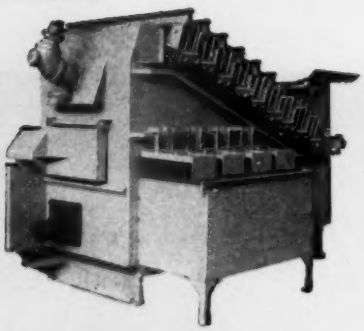
A small reverberatory furnace for melting and holding, or for holding only when hot charged at the die casting machine. Made in various sizes to meet your requirements.





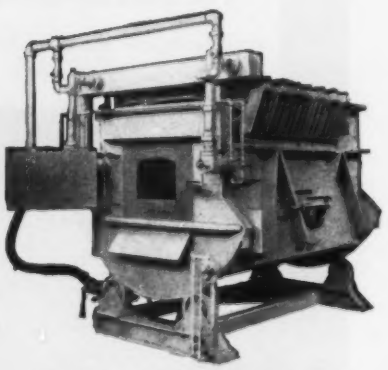
MODEL "BFC"

Hand tilt, open flame, barrel type furnace with flames firing tangent to inside of lining. Very fast melting. Used in all type plants including smelters. Capacities—500 lbs. Aluminum. A must for all aluminum jobbing sand foundries.



MODEL "MC" DIP-OUT TYPE

For melting and holding all in the same furnace. Hot metal always available. No iron pots or crucibles to replace. Capacities from 500 to 5000 pounds of aluminum.



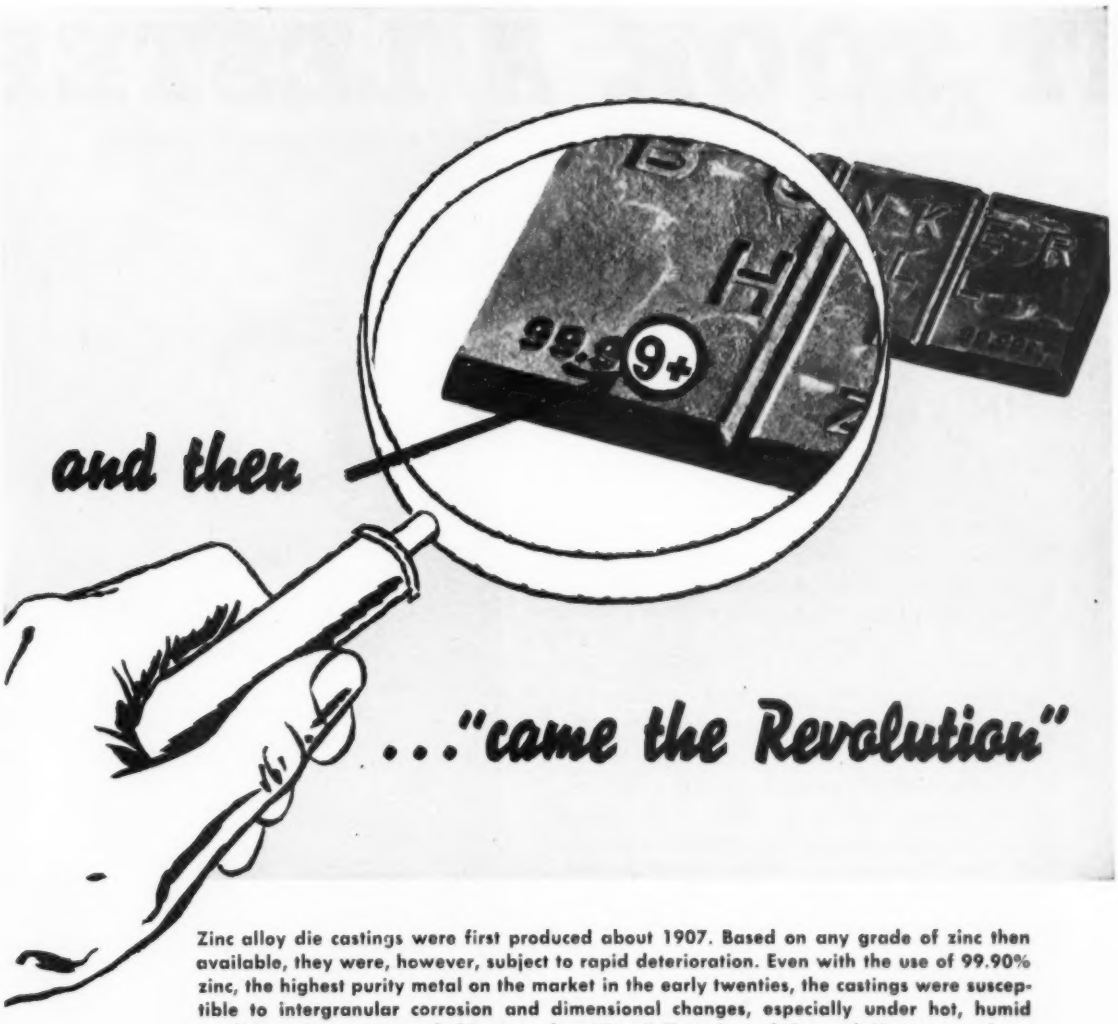
MODEL "SW"—TILTING TYPE

Excellent to run back returns along with ingot required for permanent mold, die or sand casting operations. Also an ideal breakdown furnace. Capacities—600-1000-1700-3000 lbs. Aluminum.

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.



Zinc alloy die castings were first produced about 1907. Based on any grade of zinc then available, they were, however, subject to rapid deterioration. Even with the use of 99.90% zinc, the highest purity metal on the market in the early twenties, the castings were susceptible to intergranular corrosion and dimensional changes, especially under hot, humid conditions. It was around this time that "Boss" Kettering of General Motors — perhaps sensing the possibilities inherent in the die casting process and its potential value to the automotive field — said to an early die casting experimenter: "Give us *stable* die castings, and you'll have a big market in our industry."

Early tests had indicated that the impurities in the base metal were responsible for the casting's dimensional instability and thus limited their field of application. The chief obstacle to the expansion of the young die casting industry was the fact that a grade of purer zinc was not being produced at that time. This obstacle was overcome in 1928 with the first commercial production of a 99.99+% metal — BUNKER HILL ZINC — and, as expected, it revolutionized the die casting industry.

The tonnages of zinc consumed annually by die casters in the early twenties amounted to a few thousand tons, and the application of castings were limited to the automotive and a few other fields. In recent years, the use of zinc alloy die castings has spread into industries too numerous to mention, with consumption averaging nearly 300,000 tons of Special High Grade Zinc annually. Bunker Hill still continues to pioneer in the production and the quality control of the highest purity zinc metal.

EASTERN SALES AGENTS **ST. JOSEPH LEAD COMPANY** 250 PARK AVENUE, NEW YORK 17

BUNKER HILL 99.99+% ZINC

SALES OFFICE FOR PACIFIC COAST **NORTHWEST LEAD COMPANY** SEATTLE, WASHINGTON

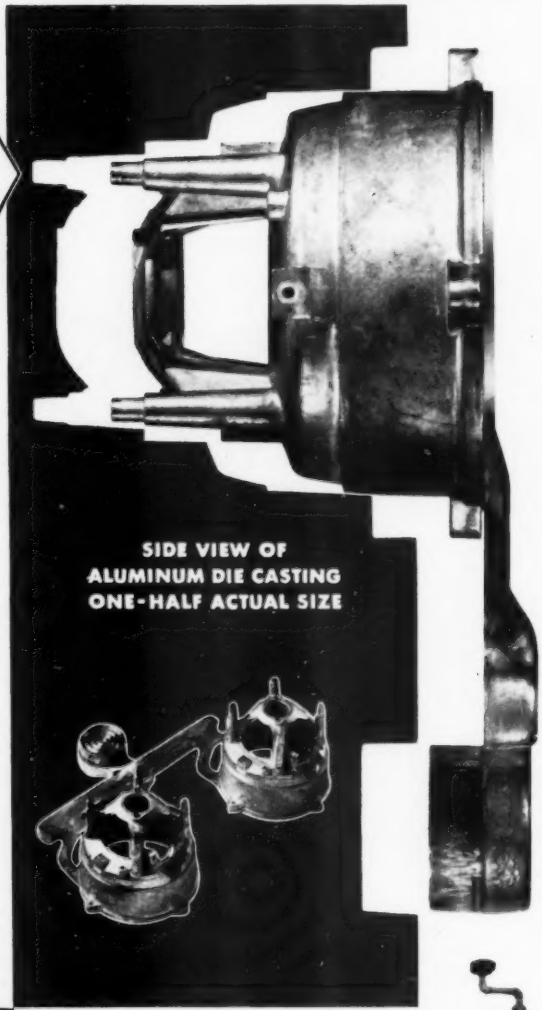
IT TOOK A LESTER

TO FILL THESE SUSPENSION LUGS FOR ELECTROLUX IN CANADA

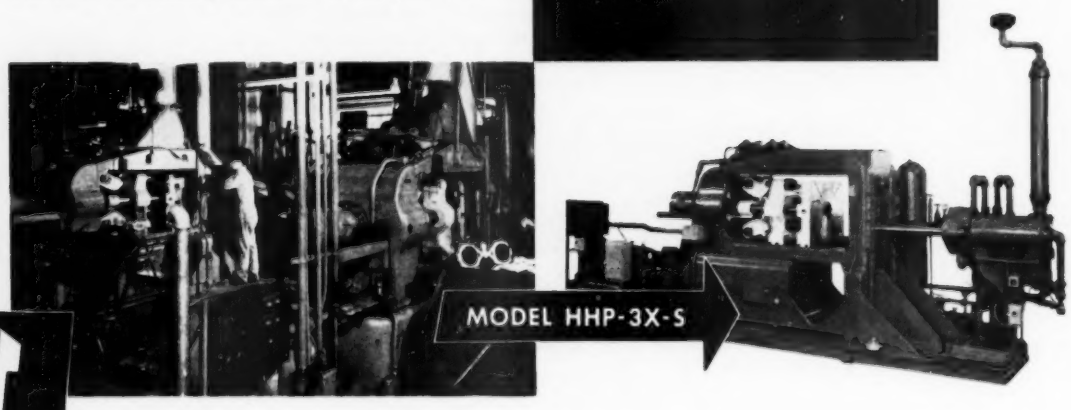
The design of this aluminum motor housing, with its four long suspension lugs, cast in blind holes, demanded the utmost in shot speed control and high final squeeze. Several other die casters attempted it and failed. But at Electrolux (Canada) Ltd., on a Lester-Phoenix HHP-3X-S die casting machine equipped with a Pre-Fill, they succeeded. These lugs were formerly steel inserts screwed into the casting. *By eliminating the inserts, Electrolux saved 12c per casting!*

This is part of the background to the success story at Electrolux where, as Mr. Edward Gaudry of the Engineering Department, says, "...We have realized a saving of approximately 30% to 40% over our previous cost of die castings, and this was accomplished... with green operators who had to be trained on the job.

Write for complete specifications on the Lester-Phoenix die casting machine to fill *your* job!



SIDE VIEW OF ALUMINUM DIE CASTING ONE-HALF ACTUAL SIZE



LESTER-PHOENIX DIE CASTING MACHINES

REPRESENTATIVES

New York . . . . Steven F. Krauld
Detroit . . . . . Thoreson-McCosh
Chicago . . . . . J. J. Schmidt
Cleveland . . . . . Don Williams
Coral Gables . Morton Machinery Sales
Seattle . Perine Machinery & Supply Co., Inc.
Cincinnati . . . Index Machinery Corp.
Los Angeles . Seaboard Machinery Co.
San Francisco . J. Fraser Rae
St. Louis, Milwaukee . . A. B. Geers

FOREIGN

Toronto, Canada . Modern Tool Works, Ltd.
London, England . . . Dowding & Doll, Ltd.
Sydney, Australia . . Scott & Halladay, Ltd.
Japan . Okura & Co., New York, Inc.

distributed by LESTER-PHOENIX, INC. 2708-N CHURCH AVENUE • CLEVELAND 13, OHIO

For additional information Circle No. 28 on the Reader Service Card

DOLLIN Zinc & Aluminum DIE-CASTINGS

LARGE or SMALL

Specialized equipment for best quality at lowest cost . . . including high-speed *automatic* machines for small zinc castings (right). Long service to many leading manufacturers. Send prints or samples for quotation—engineering advice at no obligation. Literature on request. *Dollin Corp., 614 So. 21st St., Irvington 11, N. J.*

Sales Offices: Boston • Buffalo • Canton • Chicago • Detroit • Philadelphia • Pittsburgh • St. Louis • St. Paul

For additional information Circle No. 15 on the Reader Service Card

Now...

from America's finest precision parts plant you can get Highest-Quality Powder Metal Parts

Your most rigid specifications for top-quality powder metal parts of all alloys can be met fully and promptly by the Metallurgical Products Division of Thompson Products. Our experience in producing millions of parts to commercial and aircraft tolerances enables us to supply accurate, properly engineered parts in large or small quantities at lowest prices compatible with highest quality. This engineering and metallurgical experience can help you redesign to fully utilize the strength and economy of powder.

Your present product . . . or one you plan to make . . . can probably benefit from savings and improvements made possible by using powder-metal parts.

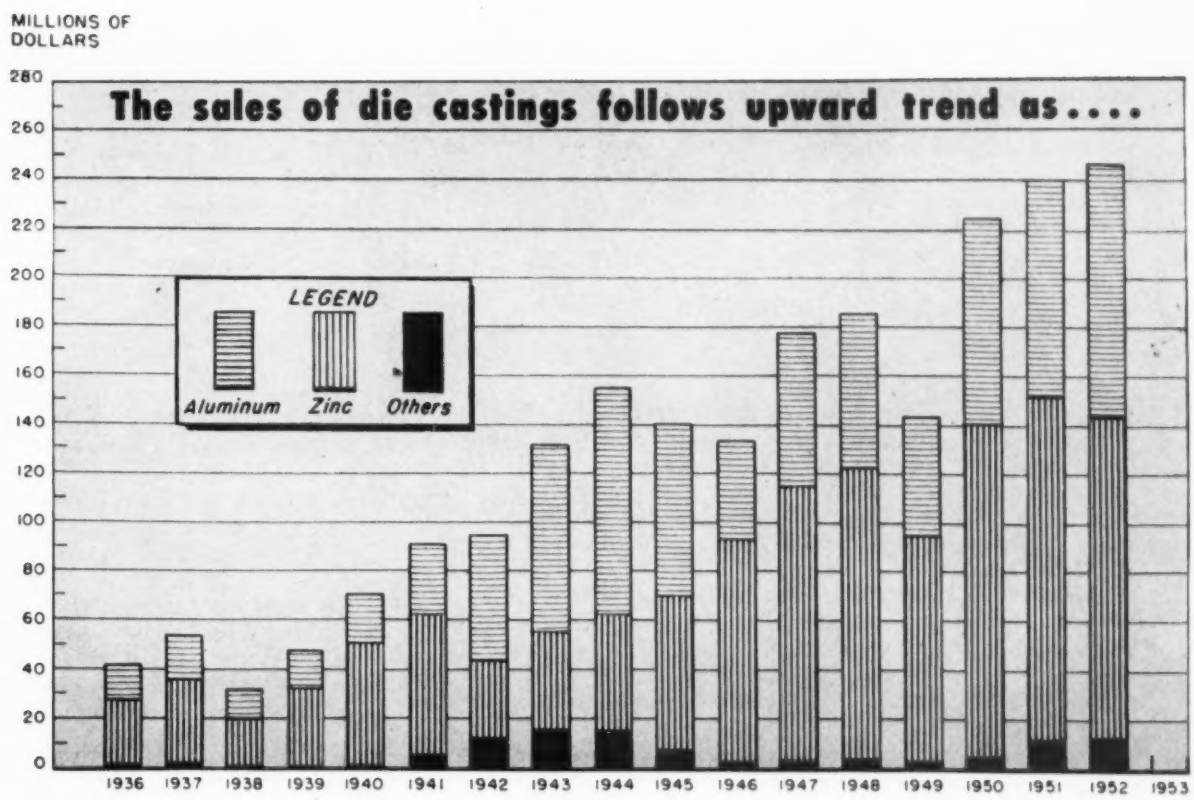
Let us help you take full advantage of a shift to powder metal parts. We'll be glad to advise on engineering and design. To find out more about Thompson's facilities, write for Booklet MP-532.

METALLURGICAL PRODUCTS DIVISION

Thompson Products, Inc.

DEPARTMENT MX-9 • CLEVELAND 17, OHIO

For additional information Circle No. 41 on the Reader Service Card



. . . AMERICAN DIE CASTING INSTITUTE celebrates its silver anniversary

25th

AMERICAN DIE CASTING INSTITUTE · MEMBER · DCI

Anniversary

BACK in 1928 when representatives of 22 commercial die casting companies got together to form the American Die Casting Institute, they found that they had certain problems in common that could be solved better working as a group, even though the individual companies were competing for business in what was then a somewhat narrow market.

Their problems related to industry standards, to customer acceptance, to cost accounting methods, to technical production difficulties, to methods of getting good quality plating on their castings.

How well they and the entire die casting industry have met the problems can be judged by the enormous growth of the industry during these past 25 years. Although no figures are available for 1928, a report for 1936 shows total sales of all types of die castings came to slightly more than $40,000,000 and by 1938 slipped back to about $30,000,000. **Since that time, growth has been steady and in 1952, commercial die casters sold nearly $250,000,000 worth of castings.**

continued next page

An industry grows . . .

Credit for this growth cannot be given to any single agency; it would have to be distributed among the die casters who have enhanced the acceptance of their own product by producing good quality castings, the metals producers who have developed improved alloys, the research departments and organizations who have contributed new knowledge of the field, and the trade press that has helped to publicize, promote and sell the industry's output.

But throughout the entire period, the American Die Casting Institute has represented the best, concerted effort of the die casting industry to improve its own product, methods and sales to benefit both die casters and their customers.

Late in 1928, a meeting was held at the Lotos Club in New York at which a group of die casters talked over the pro's and con's of becoming organized. They decided they had much to gain by uniting, and formed the American Die Casting Institute.

They met again in June of 1929 at Philadelphia's Union League Club, with some 27 die casting companies attending the meeting.

A news report of that meeting gives some interesting insight into problems that plagued the die casters then. Before the meeting, members had been given a print of a shank regulator handle and asked to give estimates on 10,000 and 50,000 pieces.

H. R. Rinehart, then secretary of the Institute, gave tabulated figures at the meeting which illustrated the extremely wide variation in costs submitted by various members. Need for an accurate, uniform system of cost computation was seen, and it is significant that this has been a continuing field of study by members of the Institute.

In 1935, as in 1929, cost accounting methods occupy a major place on the Institute's agenda.

At that first meeting, Charles E. Adams, then of Cleveland Hardware Company of Cleveland, Ohio, reported on "The General Business Situation and Its Relation to the Die Casting Industry."

He pointed out that the numerous business mergers then occurring would have great impact on the die casting industry. Some years ago, he said, there were numerous automobile companies, but by 1929 there are only about 30 possible customers in this field for the die casters. He predicted that a few years hence there would be only five auto builders.

Mr. Adams told his fellow die casters that he could foresee a tremendous potential field for die castings, but called for cooperation of firms in the industry to break down the distrust with which die castings were regarded.

Benjamin Freeman, technical director of the National Chromium Corp., in a paper on the "Preparation of Castings for Plating," told the group that the characteristics

COMPARATIVE ANALYSIS

USE OF ZINC AND ALUMINUM FOR DIE CASTING

(1947-1952 With Forecast for 1953)

Year	Estimated Job Shop	Estimated Captive	Estimated Total All Die Casting
	ZINC (Tons)		
1947	158,000	52,500	210,500
1948	148,500	70,000	218,500
1949	116,000	72,000	188,000
1950	170,000	97,000	267,000
1951	146,000	80,000	226,000
1952	133,000	70,000	203,000
1953 Forecast	186,000	90,000	276,000
	ALUMINUM (Pounds)		
1947	91,400,000	18,100,000	109,500,000
1948	100,250,000	18,750,000	119,000,000
1949	76,000,000	12,000,000	88,000,000
1950	127,000,000	16,500,000	144,000,000
1951	106,000,000	22,000,000	128,000,000
1952	127,500,000	28,000,000	155,500,000
1953 Forecast	185,000,000	33,000,000	218,000,000

*ADCI — April 1, 1953

The Tonnage Of Die Castings Is Going Up and Up

of a good plate are beautiful surface, durability, and thickness of the plate.

Charles Pack, then a consulting engineer, discussed work being carried out by the American Society for Testing Materials, involving the testing of some 80,000 test bars for chemical and physical properties, corrosion resistance and X-ray inspection.

Committee chairmen who reported at that first meeting included A. H. Bergedick of Perfection Die Casting Corp. in Cleveland; E. W. Dollin of Allied Die Casting Corp., Long Island City; and W. G. Newton of the Newton Die Casting Corp., New Haven, Conn.

Of the 22 founding members of the American Die Casting Institute, several are now out of business, some have changed names or split into two or more concerns, but most are still in business making die castings and are still active members of the Institute.

A tally of those 22 companies shows: Alemite Die Casting & Mfg. Co. of Chicago (now Electric Auto-Lite, Die Casting Div.); Badger Die Casting Co. of Milwaukee; and Barnhart Bros. & Spindler of Chicago (no longer in business).

Bohn Aluminum & Brass of Detroit (no longer doing die casting); California Die Casting & Mfg. Co. of Hollydale, Cal. (out of business); and Cleveland Hardware Co. of Cleveland (now Cleveland Hardware & Forging).

General Die Casting Co. of Reading, Pa., (not in the die casting business); C. M. Grey Mfg. Co. of East Orange, N. J.; Krone-Sebek Casting & Mfg. Co. of Chicago (out of business, but three successor companies include Paul Krone Die Casting Co., Federal Die Casting Co., and Central Die Casting & Mfg. Co.).

Illinois Die Casting Co. of Chicago (out of business); Latrobe Die Casting Co. of Latrobe, Pa.; and Mt. Vernon Die

continued on page 93

How die castings gained approval by Army Ordnance

Col. J. H. Frye W. J. During H. F. Schroeder

ACCEPTANCE of die cast components by U. S. Army Ordnance during World War II came as a result of technical work and liaison set up by the American Die Casting Institute. It is an example of constructive work in the national interest accomplished by this organization.

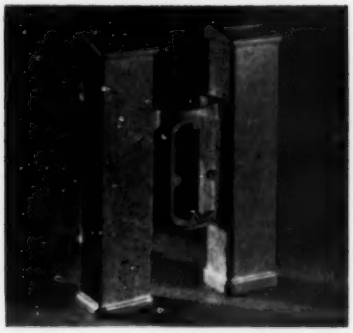
Reprinted here from DIE CASTINGS magazine of December 1944 is a tribute by Col. John H. Frye of the Ordnance Research and Materials Service, in presenting the Ordnance Distinguished Service Award to the ADCI in November of 1944.

" . . . At the present time, the cooperation of your industry is measured largely in the terms of production, but there was a time when the Ordnance Department used very small quantities of die castings. In fact, there was a time when Ordnance engineers believed that die castings were suitable only for non-functioning parts, such as automotive door handles, radiator caps, ballistic wind shields, and similar items.

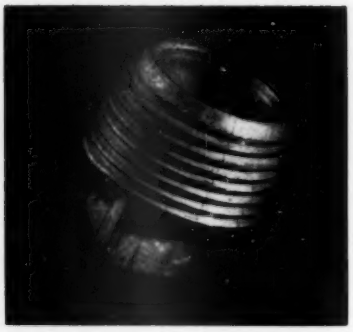
"Prior to the war, and during the early phase of the 'Emergency', the production of fuze components was on such a reduced scale that it was apparently uneconomical to produce these parts by the die casting process. Because of the Ordnance engineers' adverse opinion of die casting quality, which existed at that time, and because Ordnance had insufficient funds to permit the making of dies for relatively small quantities of components, it was necessary to depend upon parts whittled from aluminum bar stock by screw machine operations. It was obvious from the ammunition program that this means of fabricating was not adequate, and that some means of mass reproduction of parts must be initiated if this program was to be met. At the same time, restrictions were placed on the manufacture of peace time products and the die casting industry began to suffer from lack of business.

"The urgent need for the Ordnance Department for production, and the equally urgent need of the industry for business made the solution to both problems obvious. Unfortunately, many ammunition components were designed about the use of aluminum, and the increasing shortage of primary aluminum at that time caused the industry, its labor officials, and Government

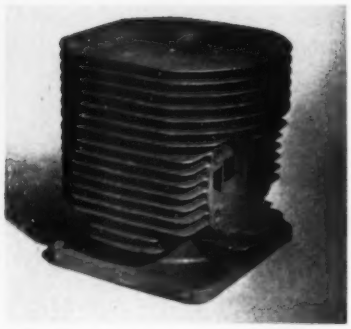
continued on page 121



500F . . . LEAD AND TIN



775F . . . ZINC



1150F . . . ALUMINUM

Die castings in higher temperature alloys may result from DIE STEEL STUDIES

25th

AMERICAN DIE CASTING INSTITUTE · D CI · MEMBER ·

Anniversary

WITH a preliminary investigation into the nature of heat checking in die casting dies, the Die Casting Research Foundation — now two years old — has launched its program which has as an ultimate objective **"to adapt the industry's one step method of 'raw material to finished part' to the most widely used, lowest cost, best physical propertied metal."**

How this is to be accomplished, what steps have been taken so far, what the Foundation is and who its members are will be examined here for the first time by any publication.

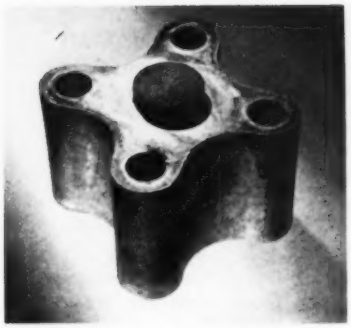
Success of this program would extend the range of the die casting process upward into the higher melting alloys through the development of improved die steels and other die materials.

At the same time, it is expected to result in improvements in the die casting of present alloys: longer die life, better die lubrication methods, more satisfactory die casting machine parts, and other process refinements.

In an announcement of the Foundation in 1951, the following benefits were listed:

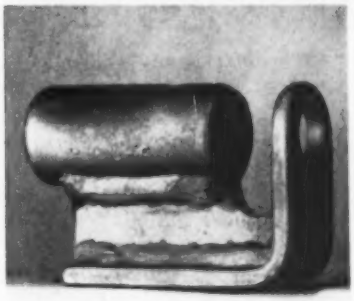
The probable development of improved steels

- Better die steels for die casting aluminum and magnesium alloys. Lower die replacement cost and maintenance expense. Higher quality die castings which can be produced with less taper, smaller cast-in holes, closer tolerances, etc., at lower net cost.
- A satisfactory die steel for the improved production of brass die castings.
- Improved die casting machine parts. Better functioning and longer lasting plungers, pistons, cylinders and goosenecks. Lower maintenance cost. Lower



1200F . . . MAGNESIUM

1650F . . . BRASS



? . . . IRON, STEEL, ETC.

of the Die Casting Research Foundation

replacement cost. Less down-time. Lower total production costs.

The likely development of new materials

- Machine parts impervious to attack if aluminum is die cast with an immersed piston and cylinder.
- A new material for both dies and machine injection parts for brass die casting.

The possible development of new materials

- For machine injection parts that may result in a universal machine for use with zinc, aluminum, magnesium or brass alloys.
- A die material suitable for the die casting of the higher melting point metals — gray iron, titanium, steel.

Although some commercial die casting of brass is practiced currently, the rapid deterioration of dies limits sharply the economical uses for this type of die casting.

One immediate benefit foreseen growing out of the research program is development of die steels which do not check or wash during the casting of brass alloys. With longer die life, brass die castings could then be produced in quantities similar to those now obtained with zinc or aluminum alloys.

What is the Research Foundation?

During the last 20 years, zinc has been the backbone of the die casting industry. Zinc alloy die castings accounted for more than 60 percent of the industry's dollar volume. Zinc die castings still represent a majority of the total pieces produced, especially the large tonnage of die castings to be chromium plated.

However, advances in techniques for die casting higher melting alloys of aluminum and magnesium, unstable markets in zinc, increasing need for light metals in many applications, and demand for die castings in metals having higher physical properties led industry members to seek wider diversity in castable alloys.

Because die casting fits so closely into the fundamental concepts of mass production: maximum interchangeability of parts and high unit output per man hour of labor — it has been considered desirable to adapt the process to die cast alloys not now die castable.

In 1951, the American Die Casting Institute studied the situation and decided to plan for the future of the die casting process.

Recognition of the fact that the low labor content, per piece, coupled with the high de-

continued next page

gree of accuracy and speed of production inherent in the die casting process would revolutionize the metal working industries, if complete success were to be achieved, indicated that a problem of such long range magnitude and import could logically be attacked only on an industry-wide basis.

They drew up plans for a research organization that would expand the scientific knowledge of high temperature metallurgy and through it extend the range of usefulness of die casting. A research program was suggested, methods of procedure agreed upon and an organization formed.

It is the intention of the Foundation, as a non-profit scientific organization, to make available readily and equitably all materials and process developments to the entire industry, subject only to prudent safeguards consistent with law, in order to advance and improve the technology of the process with its resultant implications to the national economy.

Acceptance was rapid and by July 1953 a total of 62 companies had become participants in the Die Casting Research Foundation. The organization has a Founding Fund of over $100,000 contributed by participating companies. This sum is expected to reach between $150,000 and $200,000 by the time the program is in full swing.

A Board of Trustees elected by the members with the help of the Technical Staff guides the programs of the Foundation. The Trustees are W. J. During of Precision Casting Company, Inc., L. G. Vanderhoof of Steward Die Casting Division, Stewart-Warner Corp., W. M. Goldhamer of The Superior Die Casting Company, A. T. Lillegren of Madison-Kipp Corp., and A. W. Simpson, III, of Western Die Casting Company.

A 10-man technical advisory committee appointed by the Trustees from member companies meets with two technical research specialists who are directing the investigations Already two projects have been set up at Battelle Memorial Institute in Columbus, Ohio and gradually others will be established at other research centers.

Technical Consultant for the Foundation is Dr. Matthew A. Hunter, dean of the faculty at Rensselaer Polytechnic Institute. Research Coordinator for the program is Dr. James L. Gregg, professor of metallurgy at Cornell University. David Laine, ADCI secretary, is secretary of the Foundation.

On the technical advisory committee are: E. V. Blackmun, Aluminum Company of America; Joseph Fox, Doehler-Jarvis Div., National Lead Co.; E. F. Lannert, Paragon Die Casting Co., A. E. Martin, Precision Castings Co.; C. Muenger, Schultz Die Casting Co.

L. Owens, Stewart Die Casting Div., Stew-

continued on page 100

RESEARCH GROUP ATTRACTS 62 MEMBERS

MEMBERSHIP in the Die Casting Research Foundation had grown to include 62 commercial die casting companies by July 1, 1953, and continuing growth of the organization is expected.

Members include: Accurate Die Casting Co.; Advance Pressure Castings, Inc.; Advance Tool & Die Casting Co.; Allen-Stevens Corp.; Alloy Die Castings Co.; Aluminum Company of America.

Badger Die Casting Corp.; Central Die Casting & Mfg. Co., Inc.; Char-Lynn Co.; Chicago White Metal Co.; Congress Drives Div., Tann Corp.; Continental Die Casting Corp.; Doehler-Jarvis Div., National Lead Co.

Dollin Corp.; Dow Chemical Co.; Du-Wel Metal Products, Inc.; Fanarc Manufacturing Co., Inc.; Federal Die Casting Co.; Globe Imperial Corp.; C. M. Grey Mfg. Co.; Gries Reproducer Corp.

Harvill Corp.; Heick Die Casting Corp.; Hilfinger Corp.; Indiana Die Castings, Inc.; Jersey Plastic & Die Casting Co.; Kamin Die Casting & Mfg. Co.; Kiowa Corp.; Paul Krone Die Casting Co.

Latrobe Die Casting Co.; Litemetal Dicast, Inc.; Los Angeles Die Casting Co.; Madison-Kipp Corp.; L. E. Mason Co.; Milwaukee Die Casting Co.; Monarch Aluminum Mfg. Co.; Mt. Vernon Die Casting Co.

Nelson Metal Products, Inc; Newton-New Haven Co.; Nordon Die Casting Co.; Paragon Die Casting Co.; Parker White Metal Co.; Pittsburgh Dies & Castings Co.; Precision Castings Co., Inc.

Pressure Castings, Inc.; Production Die Casting Co.; Racine Die Casting Co.; Rangers Die Casting Co.; Schultz Die Casting Co.; Sterling Die Casting Co., Inc.; Stewart Die Casting Div., Stewart-Warner Corp.

Stroh Die Moulded Castings Co.; Superior Die Casting Co.; Thompson Products, Inc.; Tool-Die Engineering Co.; Twin City Die Casting Co.; Union Die Casting Co., Ltd.

Wells Die Casting Co. of California; Western Die Casting Co.; West Irving Die & Tool Co.; Yoder Die Casting, Inc.; Withrow Die Casting Co.

Research Foundation seeks answers to two questions:

25th Anniversary

- **HOW DO DIE STEELS HEAT CHECK?**
- **WHICH DIE LUBRICANTS ARE BEST?**

DEVELOPMENT OF IMPROVED DIE MATERIALS FOR DIE CASTING BRASS AND OTHER HIGH MELTING ALLOYS

THE principal deterrent to the extensive use of the die casting process for casting brasses and other high-melting alloys is the short life of the dies. A great deal of highly skilled labor is required to make the dies, and, because they fail by heat checking after making relatively few castings, the die cost per casting is usually excessive.

Benefit would accrue to the die casting industry if either the cost of making the dies could be reduced or if materials could be developed which give longer die service. Materials which give improved die life would probably also be useful in the shot cylinder and plunger of cold chamber machines.

At the present time, steel dies are used exclusively for making die castings. A great amount of effort has been expended in developing superior die steels. Even the best steels, however, fall far short of the heat-checking resistance needed for casting the higher melting alloys.

Heat checking results from the thermal stresses set up by cyclic heating and cooling of the die surface as successive castings are made. Agreement is lacking on the exact mechanism by which heat checks develop, but it is fairly certain that the following characteristics are desirable if a material is to be resistant to heat checking:

1. Low thermal expansion.
2. Freedom from allotropic transformation within the working temperature range.
3. High proportional limit and strength at elevated temperature.

Oxidation is probably a factor in the initiation and propagation of heat checks. However, increased oxidation resistance is usually imparted to metals by adding elements such as chromium or silicon which promote formation of adherent, relatively impervious films of oxides which inhibit further oxidation.

Because of the cyclic expansion and contraction of the die surface, such a film would crack repeatedly and permit progressive oxidation at the locations of the original cracks. Therefore, it seems improbable that improved heat checking resistance could be obtained by simply improving the elevated temperature oxidation resistance of the die material.

Thermal conductivity is of importance in a die material because it, to a considerable extent, would control the rate at which castings could be made. For this reason, materials having high thermal conductivity are to be preferred.

Proposed research

It is proposed that a project be initiated, having as its principal aim the development of improved die materials, which would make the die casting of brass and other high-melting alloys economically practicable. The program would con-

continued next page

sist of three broad phases, as follows:

1. A study of the mechanism of heat checking.
2. Laboratory preparation and evaluation of die materials.
3. Plant evaluation of the most promising materials.

Progress report

The initial project got under way in late January, concentrating on the first phase listed above.

Portions of dies that failed in service were collected, and from these, 16 were selected for metallographic inspection to determine the nature of heat checks. Present evidence indicates that corrosion fatigue due to oxidation in combination with cyclic stress is the apparent cause.

An apparatus has been designed to simulate the die casting production cycle and operating conditions for accelerated testing of various steels.

To determine whether thermal shock could initiate the heat checking phenomenon, rather than oxidation, an attempt will be made to reproduce heat checked specimens under both normal and oxygen-free atmospheres. It is expected that a conclusive resolution of the problem should be obtained by the controlled testing now under way.

IMPROVED DIE COATINGS AND LUBRICANTS FOR DIE CASTING BRASS AND OTHER HIGH MELTING ALLOYS

ONE of the biggest problems encountered in die casting the higher melting alloys is the premature failure of the dies by heat checking. It is thought that a major cause of heat checking involves oxidation of the die surface and, hence, it is deemed advisable to exclude oxygen from the die surface to the maximum extent possible.

Attempts to accomplish this end are generally through the use of a protective coating (die lubricant). In general, the so-called die lubricant not only functions as a mold coating which serves to prevent oxidation of the die surface and thus prolong its life and to prevent adhesion of the metal to the die, but also as a lubricant for moving parts of the die.

Lubrication of moving parts is necessary for smooth operation, but it is not absolutely essential that one material perform both functions. The ideal die lubricant would:

1. Be stable at the casting temperature and allow a large number of cycles per operation,
2. Retain lubricating properties at the lower temperatures of the moving parts,
3. Form a film on the die surface which is not removed by the casting metal,
4. Spread evenly over the die surface without concentrating and congealing in recesses,
5. Not attack the die or casting,
6. Not stain the casting,
7. Not evolve unpleasant or toxic vapors, and
8. Be inexpensive.

No lubricant has been found which approaches all points of this ideal, even for the lower melting aluminum and magnesium alloys. For higher melting metals such as the brasses, the problem is even more difficult.

A feasible solution to this problem might be to develop specialized coatings for the protection of the die surface, and other specialized materials to function as lubricants for the moving parts.

It is felt that a solution to the problem of protecting the die surface is the more urgent, although both are recognized as important problems. Hence, the search for the universal lubricant will continue.

It has been stated that almost everything has been tried as a die lubricant, the ridiculous and the sensible, from coffee and tea to kerosene and light machine oil, from duck fat to carnauba wax.

The following is a list of the classes of materials that have been used as die lubricants with varying degrees of success.

1. Saponifiable oils, such as tallow and lard. These oils corrode the dies and form gummy deposits.
2. Mineral oils. These materials are not greatly subject to oxidation, and have been used with some degree of success.
3. Waxes, such as beeswax and carnauba wax. Waxes cannot be used alone, as they form deposits in die recesses. Emulsions of waxes, particularly of carnauba wax, are commonly used. The principal disadvantage of carnauba wax for light-metal casting is its cost.
4. Graphite and molybdenum disulfide suspended in water or oils. Such materials are good high-temperature lubricants, but stain casting surfaces.
5. Silicones and fluorocarbons are being investigated. These compounds have remarkable chemical stability, and maintain their lub-

continued on page 95

25th Anniversary

Product Standards And Cost Accounting Head ADCI Program

WHEN the American Die Casting Institute holds its annual meeting in Chicago this month, it marks 25 years of growth. When the Institute was founded in 1928, the industry was a young one having limited technological experience, qualified acceptance and few practitioners. It is now one of the major suppliers of accurate metal components for the mass production industries.

Many of the old timers who took part in the founding of the Institute are still active in its affairs and will be present when the group convenes September 15-17 at the Edgewater Beach Hotel.

A feature of the business and technical meetings this year will be three panel discus-

---

PROGRAM
25th Annual Meeting of the
American Die Casting Institute
September 15-17, 1953

Tuesday, Sept. 15
Board of Directors meetings.

Wednesday, Sept. 16
9:30 a.m. Membership business meeting.

12:30 p.m. Precision Metal Molding Magazine luncheon

2:00 p.m. Cost accounting, panel discussion:

The Trend of Die Casting Dollar Volume and Physical Volume to Aluminum by Stanley Emerick of Precision Castings Co., Inc.

The Relationship of Major Cost Elements in Producing Zinc Die Castings as Compared with Aluminum Die Casting by A. E. Gessner of Aluminum Company of America.

The Operating Statement of a Hypothetical Die Casting Plant with Seven Zinc and 10 Aluminum Machines by Charles Stone of Stewart Die Casting Div., Stewart-Warner Corp.

Question and answer period, led by R. Bernhardt of the Doehler-Jarvis Div., National Lead Co.

6:30 p.m. American Die Casting Institute Cocktail Party

7:30 p.m. Annual Banquet; Guest Speaker Brigadier General Merle H. Davis, ret.: **Die Casting and the Ammunition Business.**

Presentation of the Annual Doehler Award.

Thursday, Sept. 17
9:30 a.m. Development of Product Standards for Die Castings, panel discussion:

The Need for Product Standards by Austin T. Lillegren of Madison-Kipp Corp.

What Product Standards Mean in Manufacturing by W. J. During of Precision Castings Co., Inc.

11:00 a.m. The Future of Zinc in Die Casting, panel discussion R. G. Kenley, The New Jersey Zinc Co.; Simon Strauss, American Smelting & Refining Co.

Die Casting Research Foundation

Thursday, Sept. 17
10:30 a.m. Meeting of Technical Advisory Committee of the Research Foundation with the Technical Staff.

12:30 p.m. Annual Luncheon of the Die Casting Research Foundation.

2:00 p.m. Membership Meeting

sions, devoted to cost accounting in the die casting industry; development of product standards for die castings; and the future of zinc die castings.

Guest speaker at the 25th annual banquet which climaxes the sessions will be Brigadier General Merle H. Davis, ret., of the Office of the Chief of Ordnance. Gen. Davis is a specialist in the field of ammunition and will offer an address on "Die Casting and the Ammunition Business."

Presentation of the annual Doehler Award for the year's outstanding contribution in the field of die casting will be made at the banquet. Past winners of this highest award of the die casting industry have been C. R. Maxon of The New Jersey Zinc Co., the Safety Committee of the Institute, and David Laine, secretary of the Institute.

Officers of the Institute for the 1952-53 term are: Austin T. Lillegren, Madison-Kipp Corp., president; G. M. Rollason, Aluminum Company of America, vice president; David Laine, secretary; W. J. Parker, treasurer.

Directors are: (Eastern Section) W. J. During of Precision Castings Co., Inc., G. M. Rollason of Alcoa, and T. J. Walker of Mt. Vernon Die Casting Co.

(Central section) R. A. Luedtke of Schultz Die Casting Co., H. H. Weiss of Superior Die Casting Co., George Ralls of Pressure Castings, Inc., A. J. Sanford of Cleveland Hardware & Forging Co., and H. F. Schroeder of Milwaukee Die Casting Co.

(Pacific section) R. R. Dreibus of Harvill Die Casting Co., A. W. Simpson III of Western Die Casting Co., and J. M. Davis of Union Die Casting Co.

Directors at large are: F. J. Koegler of Doehler-Jarvis Div. of National Lead Co., L. G. Vanderhoof of Stewart Die Casting Div. of Stewart-Warner Corp., and E. Anderson of Globe Imperial Corp.

OFFICERS DURING ADCI's FIRST 25 YEARS

Lillegren and Rollason — the incumbents

Year	President	Company	Vice President	Company
1929-30	C. A. Murray	Barnhart Bros. & Spindler	W. G. Newton, Jr.	Newton Die Casting Co.
1931	W. G. Newton, Jr.	Newton New-Haven Company	S. A. Hellings	Stewart Die Casting Co.
1932	Functioned as Code Authority under NRA — F. P. Assman, Chairman			
1933	S. A. Hellings (acting)	Stewart Die Casting Co.		
1934	F. P. Assman	Precision Castings Co.		
1935	F. P. Assman	Precision Castings Co.	H. H. Weiss	Superior Die Casting Co.
1936-37	S. A. Hellings	Stewart Die Casting	H. H. Weiss	Superior Die Casting Co.
1938	J. F. Hattersley	The Hoover Co.	H. H. Weiss	Superior Die Casting Co.
1939	J. W. Knapp	Precision Castings Co.	H. H. Weiss	Superior Die Casting Co.
1940	J. W. Knapp	Precision Castings Co.	George L. Meyer	Stewart Die Casting Division
1941	George L. Meyer	Stewart Die Casting Division	J. F. Hattersley	The Hoover Co.
1942	R. A. Luedtke	Schultz Die Casting Co.	Arthur Chase	Precision Castings, Inc.
1943	A. F. Waltz	Advance Pressure Castings, Inc.	H. H. Weiss	Superior Die Casting
1944	H. F. Schroeder	Milwaukee Die Casting Co.	A. J. Sanford	Cleveland Hdwe. & Forging
1945-50	A. J. Sanford	Cleveland Hdwe. & Forging Co.	G. M. Rollason	Aluminum Co. of America
1951-53	A. T. Lillegren	Madison-Kipp Corporation.	G. M. Rollason	Aluminum Co. of America

C. M. Grey of C. M. Grey Mfg. Company was elected treasurer of the Institute from its inception until the office was dissolved in 1941.

ANOTHER DIE CAST PRODUCT MADE BETTER ON KUX DIE CASTING EQUIPMENT

YALE

AND TOWNE MANUFACTURING COMPANY

makes better locks

WITH

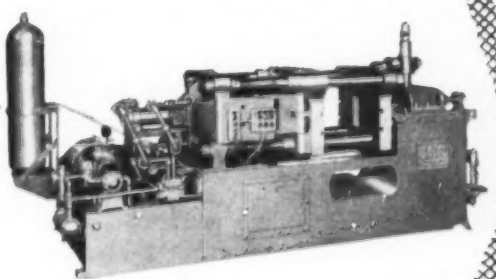
KUX

DIE CASTING MACHINES

AFTER A TWO-YEAR survey of all leading machine manufacturers, The Yale & Towne Manufacturing Company selected KUX as the line of Die Casting Machines superior to any in the country.

Now, production lines of powerful KUX Die Casting Machines, installed in Yale plants, produce their various hardware castings on a 'round-the-clock basis.

Possibly your product can be redesigned to use die castings with substantial savings in manufacturing costs. Let KUX engineers give you the answer.



MODEL BH-30 ILLUSTRATED

Hydraulically operated die casting machine for production of zinc castings weighing up to 10 pounds.

Write for illustrated catalog showing complete line of KUX Die Casting Machines.

KUX MACHINE COMPANY

6725 NORTH RIDGE • CHICAGO 26, ILLINOIS

For additional information Circle No. 24 on the Reader Service Card

THREE INSERTS DO THREE JOBS in a flywheel magneto

By S. R. ELLINGHAM*
and A. I. ALSTROM**

IN the development of small gasoline engines space and weight savings are of paramount importance. One place where this has been accomplished to a marked degree is in the magneto.

Normal engine construction formerly required that a separate magneto be built and mounted on the engine in some manner with a drive from the crank-shaft, usually through a train of gears, to the magneto. Such construction was expensive and bulky.

Some years ago, however, the engineers of the Wico Electric Co. helped in the development of what has become known as the flywheel magneto. In this type of unit, the flywheel is die cast with the permanent magnet cast as an insert in the rim of the wheel. Since a flywheel must be carefully balanced it is necessary that a counterweight of equal mass be placed in the wheel rim diametrically opposed to the magnet.

Some of the manufacturing problems of the die cast flywheel are of more than passing interest. In the illustration is shown a die cast flywheel with the magnet, hub, and counterbalance all cast as inserts, while below the wheel are seen the three individual inserts.

*Design Engineer and **Product Engineer, Wico Electric Co., West Springfield, Mass.

Inserts are held in die for accurate location

The magnet unit is a cast Alnico magnet set in a stack of shaped high permeability laminations. The laminations, of course, acting as pole pieces for the magnet. The entire assembly is clamped between two brass plates and the rivet ends holding the stack together serve as anchor members for holding the magnet assembly in the casting. There is, of course, some locking action due to the irregular surface of the laminations.

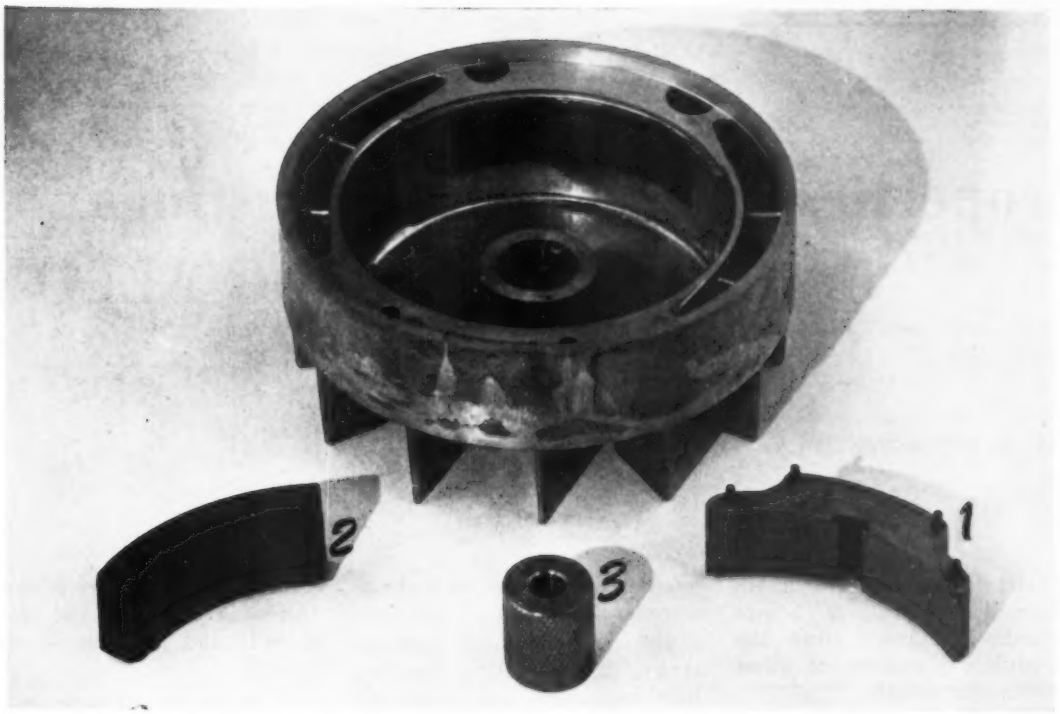
Directly opposite the magnet unit a small cast iron counterweight is cast in. This counterweight has small projections to act as anchoring lugs and, in addition, the inherently rough surface of the sand casting helps to hold the piece in place.

Both the magnet unit and counterweight are held in the die by means of locating pins that accurately hold the parts in their correct relative positions with respect to each other and also with respect to the surfaces of the casting. The hub, another insert, is a steel screw machine part that may be either a round piece knurled on the outside or a hexagonal piece. In either case a hole is made in the insert and this hole is used to position the hub in the casting.

The choice of either a knurled round hub or a hexagonal hub is, in many cases, arbitrary, depending upon available materials. However, for the heavier flywheels and for the higher speed wheels the hexagonal hub seems to give a more positive anchorage against torsional slippage.

After all of the inserts are in place the flywheel is cast around them, the particular cooling fin design being incorporated in the die for the job at hand.

In spite of the best techniques available, there is



1. Permanent magnet 2. Counterweight 3. Central hub

always some slight off-balance of the wheel as cast. Since balancing must be done in all cases, the wheels are purposely made so that the counter weight side is the heavier. In this way, all metal that must be removed will come from the side where, operationally, it can do the least harm by removal.

Naturally, for different applications the mass of the finished flywheel will vary somewhat. This variation is achieved by coring the casting where there are no inserts. In the flywheel illustrated rather large cored volumes are used to secure the lowest mass possible for a wheel of this size. In the design of the cored volumes considerable care must be exercised that the metal section between the core hole and the inserts be kept great enough so that the insert will not pull out or shift during operation. In the case shown this has been accomplished by tapering the core so that a thicker section is secured where the stresses are the greatest.

Choice of die casting alloy determined by function

An alloy that is highly fluid at the casting temperature is essential for this application. At the same time an alloy of maximum strength in the as-cast condition is needed. The strength requirement is obvious since these wheels operate at speeds up to 10,000 rpm. Further the wheels must stand a bursting test by rotation at up to 15,000 rpm.

The fluidity requirement is to secure maximum metal flow into all interstices on the inserts and to properly fill the die cavities when very thin section vanes are incorporated in the wheel design (this type of vane is not illustrated). To properly secure both of these characteristics a high silicon die casting alloy is used such as an ASTM No. S5 containing about 12 percent silicon, 2 percent iron and 3.5 percent copper. Such an alloy has an ultimate tensile strength of about 45,000 psi in the as-cast condition.

There are, of course, numerous machining operations that must be done on these flywheels. Both faces of the hub are machined, the hole bored and reamed and a keyway cut in. On the casting itself those areas indicated by arrows on the illustration are finish machined after casting. Because of the necessary machining and balancing the original casting can be made to rather loose tolerances. As a general rule the foundry holds the castings to $\pm$ 0.005 on all dimensions and the ID and OD to $\pm$ 0.010 TIR.

The outside surfaces of the casting are seldom machined other than to remove flash at the parting line and no surface finish at all is given the wheel.

Properties and uses of die castings in the LOW MELTING ALLOYS

By W. W. RICHMOND*

THE die casting of lead, tin and their alloys is not radically different from the pressure die casting of other non-ferrous metals.

Because of their relatively low melting points and other physical and chemical characteristics, they lend themselves to all methods of casting, whether in sand, permanent mold, slush mold, centrifugal mold or pressure die.

The great advantage of these low melting alloys based on lead and tin — and at the same time, a great problem for the die caster — is the almost unlimited range of alloy compositions which can be and are commercially cast.

The end uses of castings made of these alloys reaches into businesses too numerous to catalog, often requiring a specific alloy to meet exact performance requirements.

The range of uses is tremendous: from batteries to food handling equipment, from rayon machinery to bearings, from business machines to instrument parts. In these and many others, lead-tin alloy die castings are playing an essential part.

Although the cost of making dies and molds is equal to that of making dies for other metals, the die life when casting these low temperature alloys is unlimited as far as the effect of heat and abrasion is concerned.

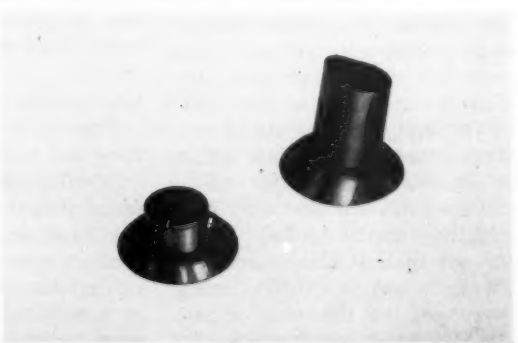
As with all other types of metals, there are both advantages and disadvantages. Some of the special advantages of these lead and tin base alloys can be appreciated from the descriptions and photographs illustrating typical applications. For many uses, their chemical stability, accurately controlled softness, low melting point and other properties cannot otherwise be attained.

Principal disadvantages of these metals are in connection with handling, although, of course, where strength, heat

*National Lead Co., New York, N. Y.

Lead and Tin Die Castings are Used in Many Places . . .

. . . Soda Fountains



. . . Rayon Machines

TABLE 1

THE LOW-MELTING DIE CASTING ALLOYS

	Tin Base					Lead Base						
Alloy Grade	1	2	3	4	5	6	7	8	9	10	11	12
Composition												
Copper	4.5	3.5	8.33	3.0	2.0	1.5	—	—	—	—	—	—
Tin	91.0	89.0	83.33	75.0	65.0	20.0	10.0	5.0	5.0	2.0	00.0	00.0
Antimony	4.5	7.5	8.33	12.0	15.0	15.0	15.0	15.0	10.0	15.0	15.0	10.0
Lead	0.0	0.0	0.00	10.0	18.0	63.5	75.0	80.0	85.0	83.0	85.0	90.0
Spec. Gravity	7.34	7.39	7.46	7.52	7.75	9.33	9.73	10.04	10.24	10.07	10.28	10.67
Yield point in psi												
20C	4400	6100	6600	5550	5050	3800	3550	3400	3400	3350	3050	2800
100C	2650	3000	3150	2150	2150	2050	1600	1750	1550	1850	1400	1250
Ultimate Strength, psi												
20C	12850	14900	17600	16150	15050	14550	15650	15600	14700	15450	12800	12900
100C	6950	8700	9900	6900	6750	8050	6150	6150	5850	5750	5100	5100
Brinell Hardness												
20C	17.0	24.5	27.0	24.5	22.5	21.0	22.5	20.0	19.0	17.5	15.0	14.5
100C	8.0	12.0	14.5	12.0	10.0	10.5	10.5	9.5	8.5	9.0	7.0	6.5
Melting point Centigrade	223	241	240	184	181	181	240	237	237	242	244	245
Proper pouring temperature -C	441	424	491	377	366	346	338	341	327	332	332	329

resistance, abrasion resistance or similar properties are desired, the designer must look to other metals.

Some of the lead alloys, as cast, are quite soft and greater care must be taken in trimming than is needed for other die castable metals. Many pieces must be caught and placed in the tote box by hand, but others can be handled as freely as other metals. Packing the comparatively soft pieces must also receive special consideration, whereas zinc or aluminum die castings can be handled and packed more casually.

Likewise, zinc or aluminum die castings can be belt sanded to remove flash or blend contours without too much difficulty, but with softer alloys, belts and wheels tend to clog. Overgrinding is prevalent. As a result, we have found that all finishing, other than die trimming, can best be done by hand filing.

We handle about 16 different alloys in die casting. Therefore, the handling of scrap must be controlled very carefully. Contamination by mixing alloys would alter the characteristics needed in the finished casting.

Some of the more commonly die cast alloys of lead and tin are tabulated for the designer's convenience in Table 1, showing composition, and physical characteristics at two temper-

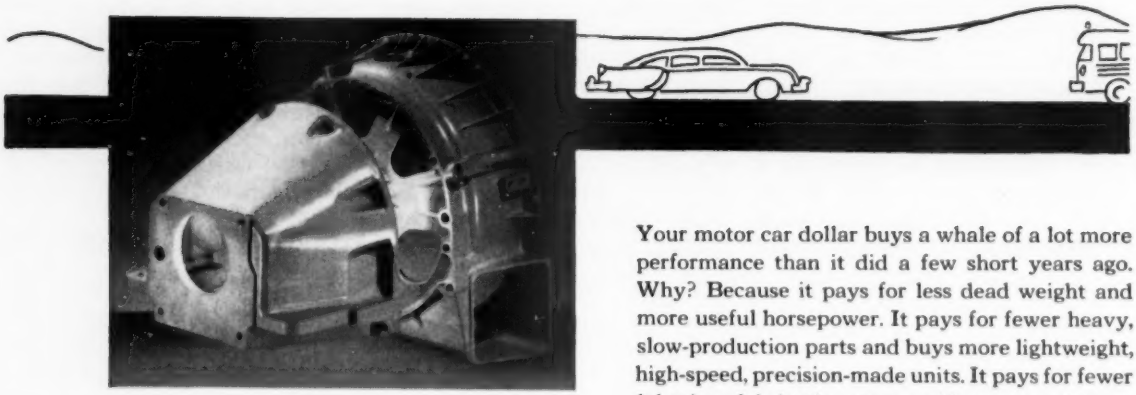
continued on page 101

. . . Milking Machines

. . . Fire Extinguishers

How Doehler-Jarvis

halve the weight and



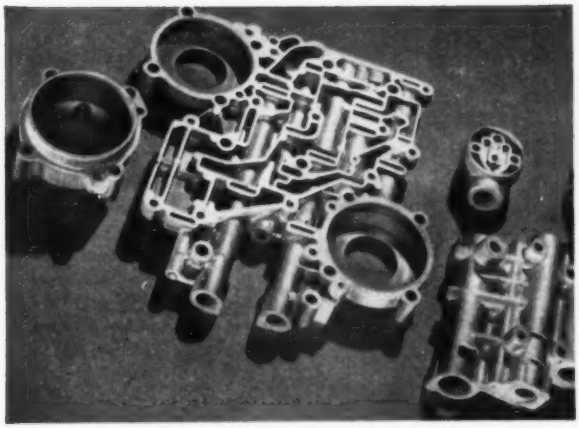
These torque converter and clutch housings are light, sound and strong. They withstand great vibrational stresses and the jarring and jouncing encountered in endless miles of "shift-free" motoring. As cast by Doehler-Jarvis, these housings provide many economies in machining costs. For one example, the long oil holes in the torque converter housing are cast-in.

Your motor car dollar buys a whale of a lot more performance than it did a few short years ago. Why? Because it pays for less dead weight and more useful horsepower. It pays for fewer heavy, slow-production parts and buys more lightweight, high-speed, precision-made units. It pays for fewer laborious fabrication steps and buys more streamlined assemblies of formed-to-fit parts.

As a case in point, consider the automatic transmission. It has become progressively more efficient, lighter in weight, part for part – and less expensive to own and operate.

These improvements have been made possible to a great extent by the use of die cast parts, many of which are produced by Doehler-Jarvis in close cooperation with motor car makers.

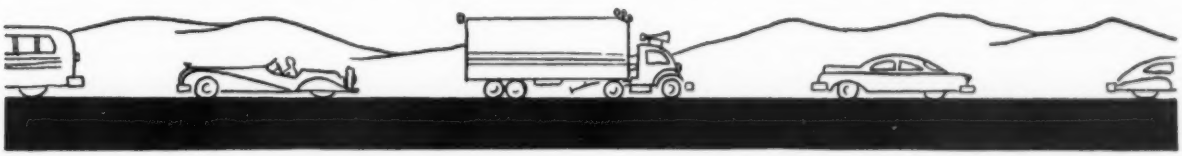
For additional information Circle No. 14 on the Reader Service Card



Valve castings used in an automatic transmission. These parts are among the most intricate of the multitude of die castings made by Doehler-Jarvis. Obviously extreme dimensional accuracy is required for proper fit and functioning of all valve components.

Helped Motor Car Makers

lower the cost of heavy duty housings



A prime example of this teamwork between the customer's design and engineering staffs and those of Doehler-Jarvis is the set of housings – torque converter and clutch – illustrated.

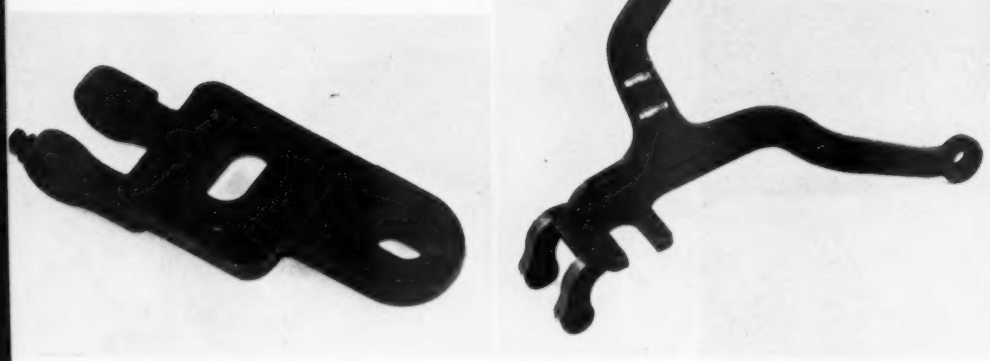
These are truly heavy duty parts. Before Doehler-Jarvis entered the picture they weighed together about 50 pounds and required considerable working-over and machining prior to assembly. The Doehler-Jarvis aluminum housings weigh about 23 pounds and require a minimum of handling before assembly.

This is but one example of how the Doehler-Jarvis organization, with resources and resourcefulness developed during a half century of die casting, works hand-in-hand with makers of metal products – in the automotive, household appliance, office machine, electrical merchandise and many other important industries.

Call in Doehler-Jarvis when you are faced with problems in the design and procurement of lighter weight, lower cost, more efficient metal parts.

Doehler-Jarvis Division
of
National Lead Company
General Offices: Toledo 1, Ohio

*Reg. U. S. Pat. Off.



TWO ZINC die castings that replace iron sand castings. Except to ream hinge holes and tap the set screw holes these castings are used as delivered. Contrast this with machining all holes and surface finishing by grinding or sanding all surfaces on a sand casting. As in other cases section thickness was reduced by die casting.

WHY SAND CASTINGS LOSE OUT in competition with more accurate parts

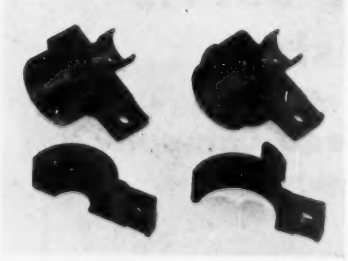
FOR the past several years, PRECISION METAL MOLDING magazine and its predecessor, Die Casting magazine, have repeatedly stressed the conversion of sand castings on which a considerable amount of machining must be done, to one of the precision metal molding processes.

Many notable examples of this conversion to a more precise method of manufacture have been cited. In practically every case, there has been a marked reduction in the final cost of the part ready for assembly on a machine. In some cases the apparent cost was higher, but closer examination revealed that other factors which could not be directly chargeable to the specific job showed sufficient advantage to warrant the change.

The following examples are parts used by the Foster Machine Co. on yarn and thread winding machines. Almost all of them represent a change from a machined rough sand casting to a more precisely made piece by the three precision molding methods involved. All pieces show either a functional advantage or a decrease in final cost.

The surface finish on all of the die castings shown is the same. The as-cast surface of the parts is adequately smooth so that no sanding, buffing or polishing is needed. After any necessary machining, all castings are given an Iridite treatment for a paint base followed by a dip coat of air drying enamel. No other surface finish is used.

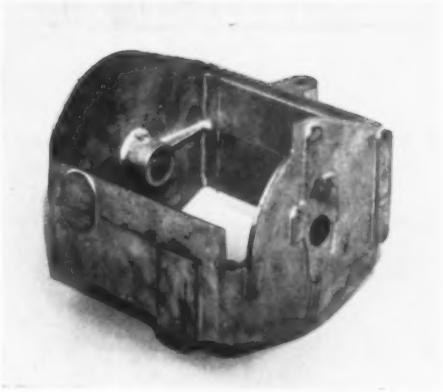
All machining is eliminated



BEARING & COUPLING COVERS — Except for the two covers that have tapped holes no machining is required on any of these zinc die castings. When the parts were made as sand castings in iron all holes had to be bored, the grooves milled and the bearing seats that bear against the outer race of ball bearings were machined. With the die cast covers a rubber mount can be used against the cast surface thus eliminating all machining.

Hole location is important

HOUSING — This large (12 lbs. as trimmed) zinc die casting is one of the major housing units on the winding machine. A smooth surface and accuracy of holes and bosses are important. To finish the part only the surface of the mounting bosses must be machined and the holes reamed. The two large holes in the end plates take self-lubricating bearings. Some smaller holes require tapping. In addition to greater accuracy as-cast, better surface and lower machining costs, die casting allows the use of far thinner sections, a distinct advantage.



Parts are interchangeable

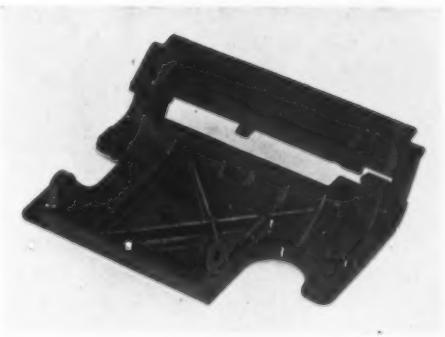
GEAR CASE — Replacing three sand castings, these three zinc die castings have cut costs on the assembled case considerably. No facing is needed on he matching parts and all pieces are interchangeable. With the older cast iron cases it was essential that the parts be assembled and then machined on the outer rim to give a smooth finished part. Thereafter, the three pieces had to be kept as a single unit through-out manufacture. The screw holes must, of course, be tapped and the four bosses shown on the largest casting are milled to insure their being perpendicular to the bore.

Bearing seats quickly aligned

SPINDLE BEARING HOUSING — Even as a zinc die casting it is difficult to hold the two end holes of this spindle bearing housing in good enough alignment so that machining is not required. However, with a die casting instead of a sand casting sufficient accuracy is secured so that the alignment job is easily and quickly done. All other holes are cored to size. Since ball bearings are used in this spindle the outer race must be anchored. By casting the groove shown, it is possible to anchor the bearing by applying a small drop of solder to the outer race and then pressing the bearing in place with the solder fitting into the cast groove. To insure proper seating and positioning the mounting faces are surface milled.

Section thickness can be reduced

STOP MOTION COVER & LIFTING THREAD BAR HOLDER — Here again, two zinc die castings are used to replace two sand castings. Actual machining is limited to reaming the hinge pin holes and a small amount of tapping. These castings illustrate again how section thickness can be reduced by die casting. The necessary rigidity is secured by properly located ribbing which allows the balance of the casting to be much thinner than would be possible in cast iron. As with all other die castings illustrated, the as-cast surface is ready for surface finishing without sanding or grinding.



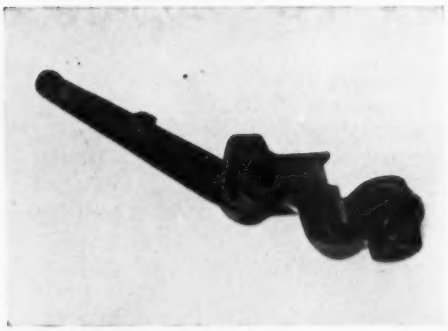
More conversions of sand castings on the next page

Shell Molding

Why sand castings lose out to more accurate castings . . .

Reduced snagging saves money

ROLL STAND — Formerly sand cast and then machined — now an iron shell molded casting. Essential machining has been reduced since the greater accuracy of the method has allowed casting the part with less machine stock allowed. Improved dimensional tolerance control has eliminated some operations. Reduction in snagging costs alone are sufficient to show a cost reduction in the part.



Smoother surfaces on shell mold castings

YOKE — A good surface is of prime importance on this piece. Not only must appearance be good, but a smooth surface collects far less lint than a rough one. A shell molded iron casting instead of a rough sand casting gives the surface desired. Added advantages of a shell molded casting are lowered machining costs and lowered snagging costs.

Two machine operations saved

PULLEY — By converting from a sand casting to a shell molded casting, two machine operation were saved. Since a mating part must fit into the recess shown, a greater dimensional accuracy and better surface finish are required than can be secured by conventional sand casting. The bore must still be reamed and the OD machined.

. . . and powdered metal parts

One molding gives three sizes

BALANCE WEIGHTS — The inaccuracies of sand casting required that these weights be made as three separate castings. Weight control required over-all machining and accuracy demanded boring both the pin and pivot holes. Now made from iron powder, only one piece is molded (the longest one on the left). To finish the parts they are cut to length and the pin hole drilled — that's all.

Powdered iron part replaces machined casting

KICKER — Formerly a fully machined casting, this small kicker is now made from iron powder. Except for drilling the pin hole all machining operations have been eliminated. The part is made in Superoilite. No oil impregnation is needed.

These examples bear out findings of PMM survey

IN THE APRIL ISSUE of PMM, a survey was presented which showed that 400,000 tons of gray iron castings now being used by industry groups (including textile machine builders) could advantageously be redesigned to the precision metal molding processes. These findings were based upon number of duplicate pieces used per year, and the number secondary operations required by these castings.

The experience of Foster Machine Company in redesigning components for their cone winder, shown at the right, from sand cast iron to the precision metal molding processes, bears out conclusions of the PMM survey.

DEPENDABLE
BETTER METHODS
SUPER CAST
DIE CASTINGS
BETTER DIE CASTINGS
SINCE 1919

The meaning of a signature!

Through a quarter of a century of knowing how, the SUPER CAST reputation for Better Methods—Better Die Castings, has been recognized.

Sound engineering, metallurgical knowledge and skilled techniques have achieved and maintained a standard of superior quality.

SUPER CAST has kept faith, always deserving the mark it bears. SUPER CAST means die castings for those who want the best.

A sound, time-tested institution and a sound time-tested product have won confidence and widespread endorsement.

DEPENDABLE
BETTER METHODS
SUPER CAST
DIE CASTINGS
BETTER DIE CASTINGS
SINCE 1919

THE SUPERIOR DIE CASTING COMPANY
1001 London Road CLEVELAND 10, OHIO

For additional information Circle No. 54 on the Reader Service Card

DIE CASTING AND THE AMMUNITION BUSINESS TO BE TOPIC

AN EXPERT in Army Ordnance will brief members of the American Die Casting Institute on the topic, "Die Casting and the Ammunition Business," in the principal address highlighting the Institute's 25th annual meeting this month.

Brig. Gen. Merle H. Davis, ret., chief of the Industrial Ammunition Branch of Army Ordnance, will be guest speaker at the banquet which will climax meetings Sept. 15-17. Program appears on page 53.

Biographical data furnished by the Army, gives Gen. Davis' background: Born in Cambridge, Vt., in 1893 he was graduated from the University of Vermont with a Bachelor of Science degree in 1915. He enlisted as a private in the Coast Artillery Corps in 1917; was commissioned a second lieutenant in that Corps later the same year; and was transferred to Ordnance in 1921.

Brig. Gen. Merle H. Davis

General Davis has had such duties as chief of the St. Louis Ordnance District; deputy chief ordnance officer in the Southwest Pacific; acting chief ordnance officer and chief ordnance officer of the American Forces in the Wstern Pacific; chief of the Rochester Ordnance District; and acting chief of the Industrial Division of Army Ordnance.

THREE REASONS
to use investment cast parts

By Wm. BANGSER*

BECAUSE of their complex contour, there are some machine parts that are pre-eminently suited for manufacture by the investment casting process. The factors which make for this peculiar suitability are:

1. *If hogged out of bar stock the part may represent a large material waste.*
2. *The part may have to be an assembly of two or more pieces which could be investment cast as a single unit.*
3. *As a sand casting, machining costs may be unsatisfactory.*

There are, of course, many other reasons for choosing investment casting as a manufacturing technique, but for present purposes consider only those.

*Chief engineer, H. Maimin Co., Inc., New York, New York.

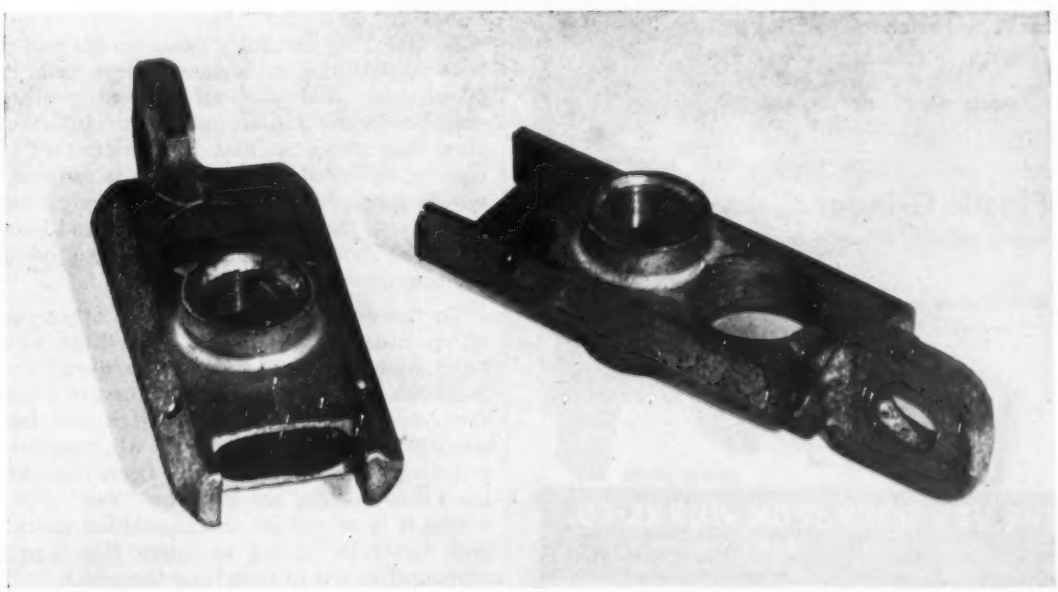
Illustrative of a part that fits all three of the above categories nicely is the cross head of the cloth cutting machine manufactured by H. Maimin Co., Inc.; this part is illustrated. Each of the above three points will be discussed as they apply to the cutter cross-head.

1. This part was previously hogged out of solid stock; it is at once evident that the loss of metal resulting from such an operation is at least 50 percent. Further, most of the operations were done on a milling machine, representing high cost shop work.

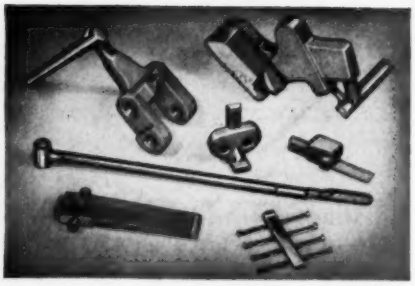
Since the location of the tongue with respect to the bore for the connecting rod pin and also with respect to the "Vee" edges is highly critical, an elaborate and very expensive fixture was made. Further, it was

continued next page

Machined? Assembled? Sand Cast ? . . . or Investment Cast?

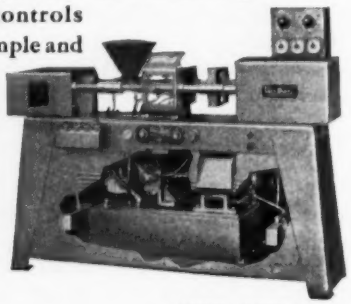


Investment Casters Prefer
VAN DORNS for
molding styrene patterns



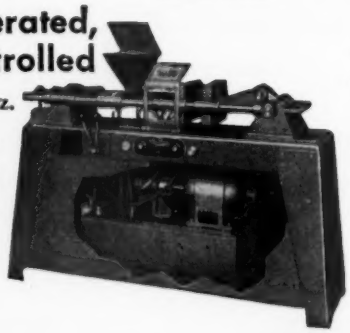
Typical precision parts produced by investment casting, using styrene patterns molded to .003" tolerances on Van Dorn Presses.

Semi-Automatic Injection Press —2-oz. capacity. This ultra-modern press has push-button controls that are safe, simple and convenient. Accurate temperature regulation. Ruggedly built, compact and quiet.



MODEL H-200

Power-Operated, Lever-Controlled Presses — 2-oz. or 1-oz. models. Have many automatic and safety features.



MODEL H-200

Plastic Grinder — grinds up waste, rejects, etc., for re-use.

Mold Bases for these presses available from stock.

Write for information on this equipment.

MODEL G-100

THE VAN DORN IRON WORKS CO.
Cable Address: "VANDORN" Cleveland
2693 East 79th Street · Cleveland 4, Ohio, U.S.A.

For additional information Circle No. 79 on the Reader Service Card

economically impossible to maintain the piece to piece accuracy that is required when the cross-heads were machined from bar stock.

2. An assembly of two or more parts could be used on this cross-head. Probably the best assembly would be to machine the cross-head body as one piece, the blade tongue as a second piece and a third piece carrying the pin bore with the necessary hubs.

These three pieces could then be assembled by either furnace brazing in a suitable jig or by welding. In either case, however, some mis-alignment would occur and possibly some warping. Enough stock would have to be left, therefore, to allow final machining to the desired size and accuracy.

As in the case of machining from bar stock, most of this final machining would, of necessity, be on a milling machine with its attendant high cost.

3. To make this part from a sand casting is, of course, out of the question. Not only would an excessive amount of machining be required, but since the part is highly stressed it is doubtful if the required strength could be secured without the use of a high alloy steel. This method of production is by far the least desirable.

Now let us consider the production problems involved when the cross-head is investment cast in SAE 1020 steel. The parts are shown as-cast except for the copper stop-off which has been applied.

The first advantage that accrues is that the single casting can be used instead of an assembly, and the casting will have a uniform fine grain structure with good mechanical properties.

By utilizing carefully made molds and disposable patterns, as is done in this case, it is possible to maintain all critical positions, alignments and dimensions within sufficiently close tolerances so that the amount of machining required on the casting is reduced to a minimum of three or four relatively simple operations: the pin hole is reamed and honed, the "Vee" running surfaces are ground and the tongue is ground.

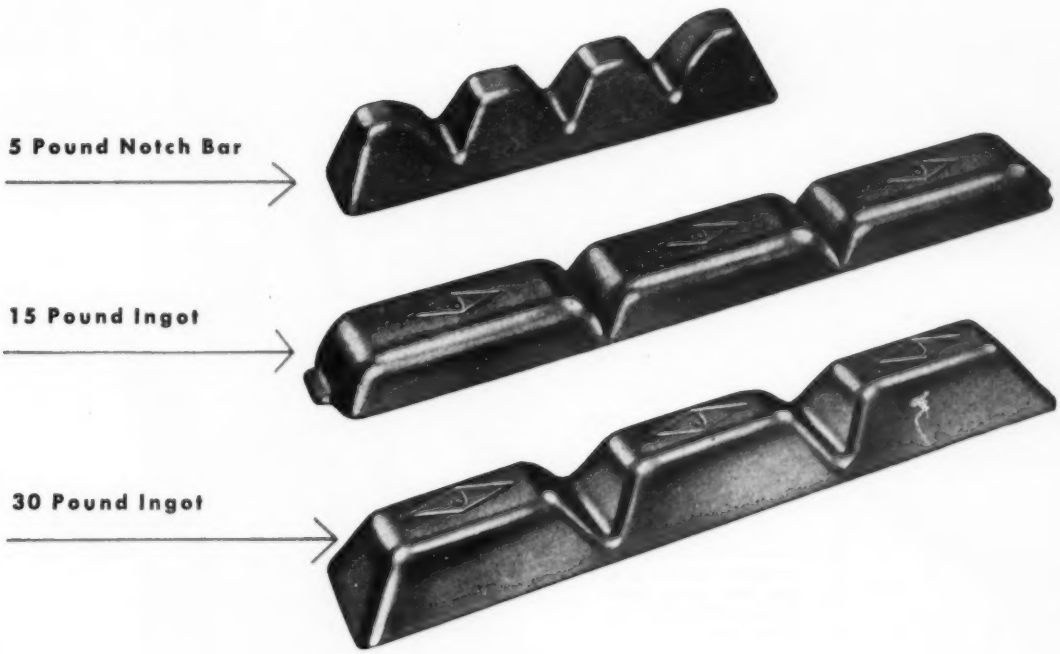
To finish the cross-head some other operations must be performed, but these would be common to such a part regardless of the method of production. Except for the tongue, the cross-head is case carburized and hardened to 62 Rockwell C. After all machining, grinding, hardening, etc. has been completed the cross head is set into the "Vee" gibs in which it is to run on the assembled machine and "worn-in" using an ultra fine lapping compound to aid in matching the parts.

DIAMOND J QUALITY

AT NO PREMIUM

IN ALL GRADES OF DIE CAST

ALUMINUM ALLOYS



You pay no premium for superior quality when you use Jobbins' Diamond-J Aluminum Die Cast Alloys. All standard and tailored alloys are available in these standard ingots. Contact Jobbins on your requirements for dependable, high quality die-cast alloys.

WILLIAM F. JOBBINS INCORPORATED

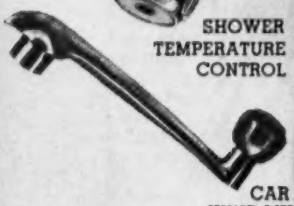
P. O. BOX 230

AURORA, ILLINOIS

For additional information Circle No. 22 on the Reader Service Card

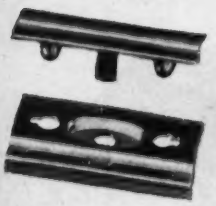
A FEW OF THE THOUSANDS OF SMALL DIE CASTING PARTS WHICH HAVE BEEN MADE MORE ECONOMICALLY THAN ON ANY OTHER EQUIPMENT.

SHOWER TEMPERATURE CONTROL



CAR WINDOW REGULATOR HANDLE

LIGHTER



RAZOR

TOY PISTOL

"HARDWARE FINISH" on your TOUGHEST CASTINGS

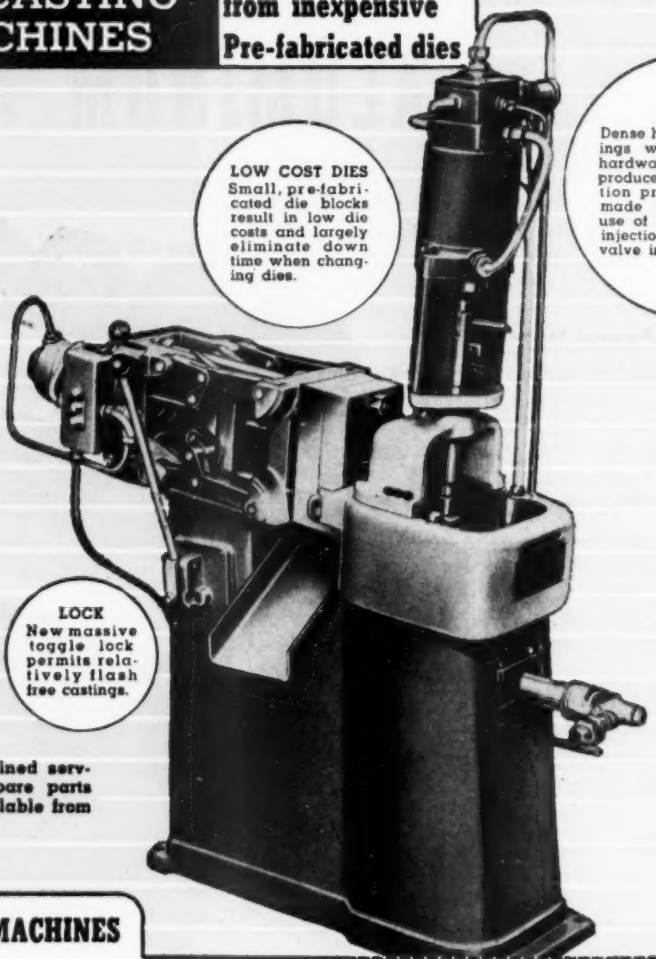
DCMT DIE CASTING MACHINES

800 SHOTS per hour from inexpensive Pre-fabricated dies

DCMT SALES CORP. U.S. AGENCY FOR BRITISH MACHINE TOOLS

LOW COST DIES
Small, pre-fabricated die blocks result in low die costs and largely eliminate down time when changing dies.

FINISH
Dense homogeneous castings with high quality hardware type finish are produced by higher injection pressures. This is made possible through use of new impact type injection and patented valve in head.



LOCK
New massive toggle lock permits relatively flash free castings.

Factory trained service and spare parts stocks available from New York.

SERVICE
Our field engineers are available to offer complete engineering and die design service. Furthermore, we will design your first die free of charge if you so desire.

DCMT DIE CASTING MACHINES

Low cost, high efficiency, small die casting machines, which have won the acclaim of engineers throughout the world. DCMT machines produce precision die castings at high speeds with remarkably low operating costs! Dies are small, inexpensive, readily interchangeable. Non-productive time reduced to a minimum!

Model	IMP 96	ADC56	M55A/HF
Size of Die Plates	6 x 9	6 x 5	6 x 5
Size of Die Plates Max.	9 x 9	8 x 6	8 x 5
Toggle Die Locking Pressure	12 tons	6 tons	6 tons
Capacity in Ounces	16	2½	12
Std. Dia. of Plunger	1½"	1"	1.200"
Floor Space	30" x 12"	35" x 12"	30" x 12"
Net Weight—Lbs.	450	250	400

DELIVERY 30 DAYS OR LESS

Complimentary Catalog

DCMT SALES CORP. DEPT. PM-9
164 Duane St., New York 13, N.Y.

- ☐ Complete details, current prices and all pertinent specifications are included in the new DCMT catalog.
- ☐ Please arrange for me to see a DCMT Die Casting Machine in operation in my locality.
- ☐ I am enclosing sample or drawing for free cost analysis as produced on DCMT machines.

Name.....

Company.....

Postion.....

Street.....

City.....State.....

DCMT SALES CORP.

164 DUANE STREET
NEW YORK 13, N. Y.

PMM

Finishing Section

SURFACE FINISHING

Most precision metal molded parts receive some type of surface finish such as plating, organic coating, anodic coating, or chemical coating. This section includes information on the methods, processes and equipment used in these surface treatments.

A Section Devoted to Specialized Finishing of

Die Castings • Investment Castings • Powder Metal Parts
Permanent Mold Castings • Plaster Mold Castings

For additional information Circle No. 108 on the Reader Service Card

Come to TUMBLE GRAV-I-FLO FINISH for ALL your tumbling needs!

You can get complete equipment and supplies for faster, better tumbling at Grav-i-Flo. This authoritative tumbling source can furnish you, from its years of experience, the correct answer to any tumbling problem.

Larger capacity machines take 31% to 80% more work-load in same floor space. Improved cutting materials shorten cutting cycle by 15% to 25%. Grav-i-Flo, installations substantially reduce capital investment, floor space, and production time!

Model 66″, two compartments

MACHINES

Model 48″, two compartments

Grav-i-Flo 66″, 48″ and 36″ machines have cam locked doors with manually released safety stops; available with unlined or rubber lined cylinders, constant or variable speed drive, J.I.C. controls, and timers from 5 minute to 20 hour cycles. Equipped with electric wiring and water piping installed ready for plant hook up.

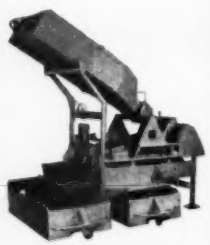
Model 36″, two compartments

Model 24″, two compartments

Designed For Small Lot Production and Laboratory Processing.

ACCESSORIES

Two deck parts-and-chips separator and chip grader



Occupies less floor space. Separates parts quickly without impingements. Grades 3 sizes of chips simultaneously.

Other Grav-i-Flo accessories include tubular yoke hoist pans, chip pans, wash-out doors, screens, chip bins, unloading boots, dip tanks.

Chips and compounds

Grav-i-Flo natural and synthetic deburring and finishing chips and highly developed compounds consistently outperform every type of tumbling process offered on the market.

Investigate!

Grav-i-Flo superiority in equipment and supplies has been proved to hundreds of users in many different industries. Let us show you, too, at no obligation. Our representative will visit your plant, or send samples direct to us. Engineering Service available to all users.

SEND FOR CATALOG showing complete line of Grav-i-Flo equipment, accessories and supplies.

THE GRAV-I-FLO CORPORATION

Dept. PM-9 400 Norwood Avenue
STURGIS, MICHIGAN

For additional information Circle No. 45 on the Reader Service Card

1. BENCH SETUP for polishing die cast zinc alloy window frame component attached to fixtures that are moved automatically under the tampico brushes. These brushes are covered by a guard when in use.

SPECIAL FIXTURES SAVE LABOR in polishing die cast window frames

IN one of the Detroit plants of the Ternstedt Division, General Motors Corporation, passenger car window frame components die cast in zinc alloy are employed in large volume. Shapes difficult to make by other means are readily die cast with unusually smooth surfaces that are easily plated and are not subject to red rust in service.

Polishing is required before plating and some of it is expedited by special fixtures, two of which are shown in accompanying illustrations. These fixtures avoid or greatly reduce hand held polishing work and, in setups like that shown, enable one man to keep two wheels supplied with work, the fixture for one being unloaded and reloaded while the other fixture is under the second wheel.

In this setup, tampico brushes are used but buffs are also employed with the same type of fixture. Polishing compound is applied to the wheels by spray guns so arranged that feed occurs only when the wheels are polishing.

Many of the die cast zinc alloy frames to be polished have legs at right angles to each other but, by use of the special fixtures, the work piece turns automatically at the bend so that legs of the work piece are brought parallel to the brush as the two legs pass under it in succession. While polishing, fixtures move over a flat steel table that is lubricated to facilitate their motion under the wheels.

When a fixture is loaded by hand, the work piece is clamped to it. Then the fixture is started under a wheel. Thereafter, neither the fixture nor the work piece is touched until they issue from under the wheel at the end of polishing, as the motion along the table is automatic. This motion is produced by a small sprocket that is turned slowly by a rotor and reducer and is located directly below the polishing wheel in a horizontal plane.

Teeth of the sprocket engage the links of a roller chain that is fastened to one side of a rib under the fixture. A roller bears against the opposite side of the rib and keeps the chain engaged with the sprocket. Hence, as the sprocket is turned, the fixture and die casting are advanced under the wheel. As the

continued next page

2. CLOSEUP SHOWS ONE WHEEL and a loaded fixture that is moved by a sprocket below the wheel. It engages a roller chain attached to the under side of the fixture, which slides along the lubricated bench top.

chain continues around and parallel to the bend in the work piece, the fixture rocks horizontally 90 degrees, after the first leg of the casting is polished. Then the second leg of the window frame is traversed under the wheel and is polished.

When the last link of the chain passes through the sprocket, the fixture comes to rest, with the zinc die casting clearing the wheel, and simply remains on the table until the operator withdraws the fixture, removes the polished die casting, reloads the fixtures and starts the next piece through the polishing cycle.

As polishing proceeds on one wheel, the fixture for the second wheel is unloaded and reloaded. Thus the wheels are used alternately and the operator keeps busy. As one man tends two wheels, labor economy is high. Unskilled labor can be used.

Similar fixtures operating in the same way are used for many different die castings and need only be made to fit the work pieces with the chain following the contour to be polished. Illustrations show the wheels uncovered but, when in operation, a guard (removed when photos were taken) covers them, both for safety and to keep compound thrown from the wheels from entering the room.

Between the guard and the bench is a slot wide enough to permit fixtures to pass through and to be placed in polishing position. Air is drawn inward through the slot by an exhaust system that carries off particles of compound and metal removed in polishing.

Machine de-burring with NOBUR pays BIG production dividends!

NOBUR Tools *turn a slow bench operation into fast and efficient machine work!* Remove burrs on multi-walled parts with a smooth, clean cutting action that won't mar highly finished surfaces. Eliminate rejects from slow, costly hand work with files, scrapers and abrasives.

Nobur Tools are used on any lathe, drill press, portable drill or flexible shaft. Operation of the double-edge cutting blade is easy and safe . . . no skilled help is required, and the spindle *never needs to be stopped* for either de-burring or chamfering.

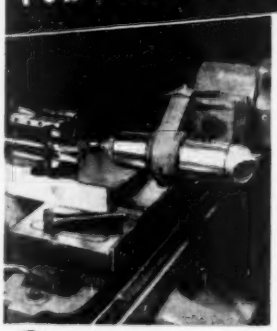
Nobur Tools cut freely on either hard or soft metals, are simple in construction and are made in sizes to cover a full range of hole diameters. ***NEW "DS" SERIES extends range of NOBUR applications to holes as small as 1/8" diameter. WRITE FOR FULL DETAILS TODAY!**

Parts like these quickly de burred with NOBUR TOOLS

NOBUR MANUFACTURING COMPANY
719 N. VICTORY BLVD., BURBANK, CALIF.

For additional information Circle No. 102 on the Reader Service Card

LOWEST COST PRECISION FOR TOOL ROOM AND PRODUCTION



ONE PORTABLE MULTI-PURPOSE PRECISE GRINDER-MILLER WITH MACHINE TOOL MOUNT DOES THE WORK OF A SINGLE-PURPOSE MACHINE COSTING 100 TIMES AS MUCH!

Little can be done today to reduce labor and material costs. For substantial savings employ new, better techniques. Mount PRECISE Grinder-Millers on lathes, drill presses, milling machines and other machine tools or use in special production set-ups. ¼ HP; speeds from 20,000 to 45,000 r.p.m.; 115 volts, AC-DC. Ruggedly built for continuous duty. All metal housing; rigid PRECISE quill; sealed micro-precision bearings. *High speeds and accurate PRECISE quill and chuck are ideal for tungsten carbide cutters.* PRECISE will grind, mill or finish any material from soft wood to the hardest alloy steel.

Write FOR NEW CATALOG

PRECISE PRODUCTS CORP., 1342 Clark St., Racine, Wis.

Precise GRINDER-MILLERS

For additional information Circle No. 103 on the Reader Service Card

"today's wonder drug" for industry

NOW . . . when it's needed most . . . the greatest cost-saving, labor-saving finishing development in a decade!

If you manufacture metal parts of any kind — this great new basic approach to finishing will give you ALMOST UNBELIEVEABLE COST REDUCTIONS.

Supersheen Speed Finishing eliminates to a great extent previous time-consuming operations like filing, grinding, polishing, blasting, buffing. It does away with costly hand deburring, and other hand operations requiring the use of large quantities of expensive materials and extremely costly skilled labor.

Nearly all types of metal parts — stampings, castings, forgings, machined parts — FERROUS OR NON-FERROUS can be simultaneously finished by the SUPERSHEEN process to absolute micro-exactness. Parts now being successfully SUPERSHEENED range in size from very small to large parts, such as jet engine blades and large gears.

Typical savings range from 48% on a threaded cast iron pipe "T" — to a 95% savings on a steel trigger with intricate configurations.

SUPERSHEEN SPEED FINISHING is used by hundreds of corporations, from the very small to the world's largest. Among them — GENERAL MOTORS CORPORATION, TIMKEN ROLLER BEARING CORPORATION, EASTMAN KODAK CO. — Mail the coupon below for complete information.

EQUIPMENT

The world's most complete and largest selling line of Finishing Barrels, Fixture and Dual Action Machines and Handling Equipment. Whatever your problem — from microfinishing small precision parts to cutting down large castings — Supersheen has the necessary equipment.

COMPOUNDS

Almco SUPERSHEEN has a great selection of different compounds — each for a specific type of barrel finishing process. This wide selection of scientifically combined compounds makes it possible to choose one which can give optimum results for a given job.

ABRASIVES

The Almco SUPERSHEEN line of abrasive chips is the most complete offered today. This great variety makes it possible to choose the PROPER TYPE of chip and the PROPER SIZE for every type of barrel finishing.

SEND FOR YOUR COPY TODAY!

MAIL COUPON BELOW

FREE NEW! EYE-OPENING 52-PAGE CATALOG

This new 52-page catalog is GUARANTEED to open your eyes to BIGGER FINISHING SAVINGS than you ever thought possible! It tells the inside story of Advanced Barrel Finishing as never told before. Shows why SUPERSHEEN Equipment pays for itself in as little as two months! A single unit replaces from 2 to 12 men. SAVINGS up to 95% on almost ALL types of parts with absolute uniformity, fewer rejects, finer finishes!

ALMCO Supersheen SPEED FINISHING

ALMCO SUPERSHEEN
Dep't D-9 Albert Lea, Minn.

Please send Free Catalog "Advanced Barrel Finishing" and details about your Free Sample Processing and Free Engineering Service.

Name _____ **Title** _____

Address _____

City _____ **State** _____

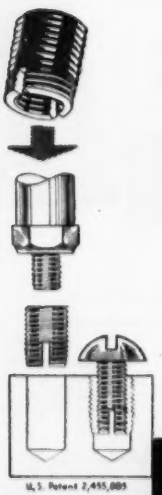
WORLD'S LARGEST SELLING LINE OF BARREL FINISHING EQUIPMENT—MATERIALS AND COMPOUNDS, FREE SAMPLE PROCESSING, FREE ENGINEERING SERVICE

TAP-LOK INSERTS* provide security at 2 vital points in EUREKA CLEANERS

The lid of the new Eureka Roto-Matic Swivel-Top Cleaner, manufactured by Eureka Williams Corporation, is held firmly by two aluminum thumb nuts. To guard against wear in the threads of these thumb nuts, each is provided with a Tap-Lok Insert, assuring a strong, hard, durable thread at this important point.

The Tap-Lok Insert is a steel bushing (other materials available, also), threaded externally to tap into a drilled or cored hole equal in size to a tap drill hole that will accommodate the external thread. The insert is also threaded internally to receive the male threaded member and has slotted segments at one end to enable it to tap its own thread.

The insert retains its seat firmly against vibration and has maximum torque-and-pull resistance. Widely used as original equipment, it is ideal also for salvage and repair of stripped threads.



Send for descriptive folder.

Also manufacturers of Groov-Pins for positive locking press fit

GROOV-PIN

U. S. Patent 2,455,085
*Reg. U. S. Pat. Off.

GROOV-PIN CORPORATION

1122 Hendricks Causeway Ridgefield, New Jersey

For additional information Circle No. 59 on the Reader Service Card

RAMPE OPENS ADDITIONAL FACTORY

Additional manufacturing space has been acquired by the Rampe Mfg. Co. of Cleveland. The new manufacturing space will be devoted exclusively to the manufacture of tumbling equipment.

ENTHONE MODERNIZES

Enthone, Inc., New Haven, Conn., manufacturers and suppliers of chemicals and equipment for metal finishing, have completed interior and exterior work on their office building. This is part of their expansion and modernization program. Improvements within the building consists of additional modern offices for officials and general office personnel and refurbishing of all other offices.

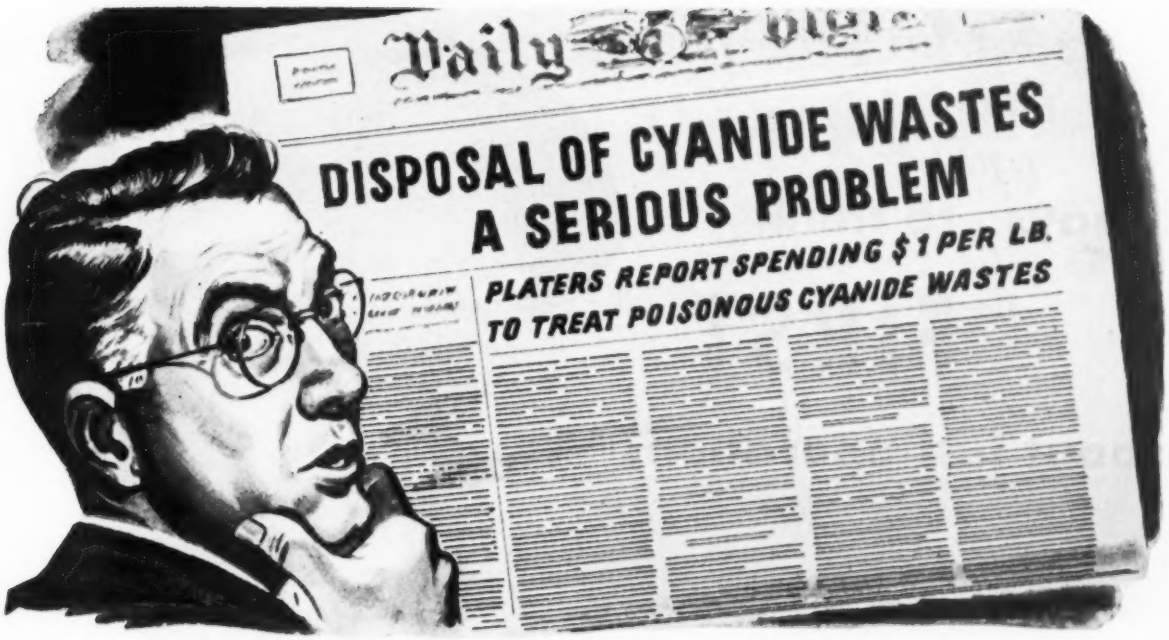
DOW CHEMICAL OPENS RESEARCH CENTER

Dedication of a new $2,600,000 research center at The Dow Chemical Company's Texas Division in honor of Dr. William Reed Veazey, recently retired Dow director and research consultant, is announced by Dr. Leland I. Doan, company president.

The research center, which has been under construction at Freeport, Texas, for more than a year, will be completed this month and it will be formally dedicated to Dr. Veazey at a meeting of the general research committee there in October.

In its 69,000 square feet of space, the research center will house the Texas Division's organic, chemical engineering and electrochemical research as well as the analytical laboratory, according to Dr. A. P. Beutel, company vice-president and Texas Division general manager.

Dr. Veazey, who retired last June after 37 years of association with Dow, turned the first earth for the research center in May, 1952, with a spade made from magnesium produced from sea water.



Cyanide Disposal Problems Minimized

by the UNICHROME Pyrophosphate Copper Plating Bath

S-M-O-O-T-H PLATING.

The fine-grained Unichrome deposit gives smoothness without the need for brighteners.

BUFFING TIME IS CUT.

If needed at all, buffing of this ductile copper takes little time, less effort.

ANODES CORRODE EVENLY.

Unichrome bath needs fewer anodes to maintain copper in solution. It keeps anodes clean and efficient.

EASILY CONTROLLED.

Unichrome Copper is stable bath, constituents are readily analyzed, has good tolerance for impurities.

ONE BATH FOR ALL JOBS.

It plates steel, zinc die castings, aluminum, intricate shapes; provides suitable undercoat for nickel, chromium; excellent stop-off for nitriding, carburizing.

Cyanide wastes *have* to be treated before disposal due to high toxicity. But installing a treating unit is expensive. So is cost of materials used.

Platers have reported spending as much as $1 for materials alone to treat each pound of cyanide waste. Add to this the cost of space required by waste treating equipment, labor costs for operating it, the high initial investment and the subsequent maintenance and you see why it all adds up to a sizable increase in plant operating costs.

The more cyanide you have, the greater this expense. But, like many other platers, you can minimize, and in some cases completely eliminate, this expense by using the Unichrome Pyrophosphate Copper Plating Solution. This bath offers greater safety because it: (1) contains no cyanide (2) is less caustic (3) has low copper concentration (4) operates at moderate temperatures.

In addition, Unichrome Copper offers outstanding advantages in operation, such as those described at left. Learn more about how this plating process can help you do better, safer plating at less cost. Write for bulletin CU-2, or discuss it with a United Chromium engineer.

UNICHROME
Trade Mark

COATINGS FOR METALS

UNITED CHROMIUM, INCORPORATED

100 East 42nd St., New York 17, N. Y. • Detroit 20, Mich.
Waterbury 20, Conn. • Chicago 4, Ill. • Los Angeles 13, Calif.
In Canada: United Chromium Limited, Toronto 1, Ont.

For additional information Circle No. 47 on the Reader Service Card

it pays up to 50% to think

FIRST

about last operations

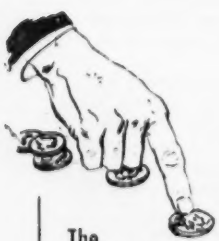
Parker-Kalon Self-tapping Screws have been cutting assembly costs of millions of metal and plastic products for over 35 years. Yet, today, thousands of manufacturers, who could gain the same benefits, still use such slow-down fastening methods as machine screws in tapped holes, bolting, and riveting. Why?

The reason is that too many product engineers think *last* about assembly because it is a final operation, then follow habit or custom in specifying fasteners.

Best way to make sure of savings you have been missing is to think *first* about fastenings . . . compare methods for simplicity, speed and security. Records show that in 7 out of 10 cases, P-K Self-tapping Screws show substantial savings, often up to 50% and more.

A P-K Assembly Engineer will help you get the facts you need. He'll call at your request. Parker-Kalon Corporation, 200 Varick Street, New York 14.

P-K Type A
— the FIRST Self-tapping Screw



The **INDUSTRIAL DISTRIBUTOR** steers your Supply Dollars to the best values.

PARKER-KALON®

The Original **SELF-TAPPING SCREWS**

GET THIS GUIDE TO LOWER ASSEMBLY COST

Filled with facts you need to plan for lowest cost when you plan assemblies. Ask your P-K Distributor, or write Parker-Kalon for Form 475-D.

This mark △ on every P-K Self-tapping Screw identifies it as genuine.

For additional information Circle No. 46 on the Reader Service Card

Large, complex aluminum die castings BRIGHT POLISHED IN A BARREL

By JOSEPH A. CERAVOLE*

HOW to produce a bright, white finish on aluminum die castings, especially the larger and more complex pieces, without expensive wheel polishing has long been a problem of the die casting industry.

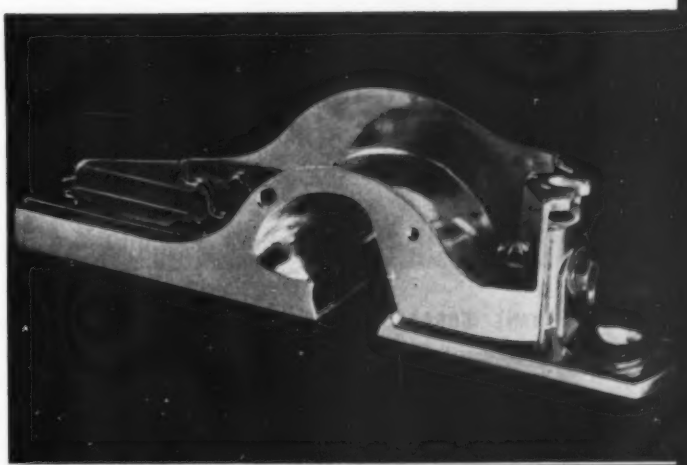
Automatic and semi-automatic polishing have been used, as have various barrel finishing techniques. Now a new barrel polishing method that depends upon a specially-designed barrel in which the castings are held on racks is being used successfully. **It produces a bright, polished finish on aluminum die castings in all present commercial size ranges.**

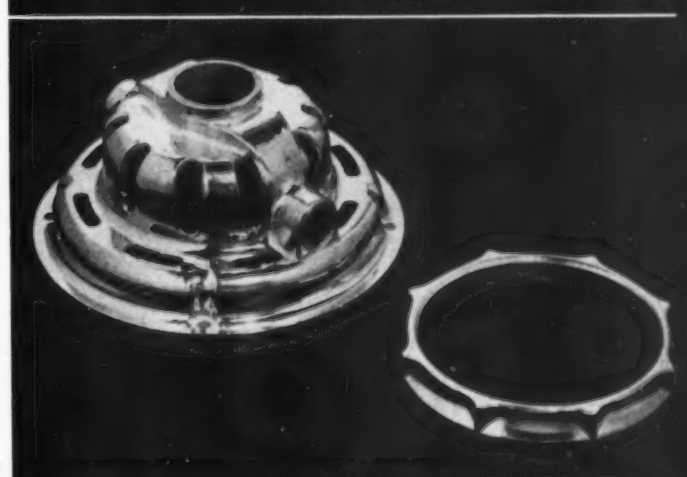
This finish is being used presently on die cast aluminum components for household appliances, hardware and electric hand tools, a few samples of which are illustrated. Advantages over buffed finish are reported to be:

- **Labor saving** — While it is impossible to generalize on cost savings for finishing castings of various designs, labor cost savings of more than 50 percent have been realized on some castings of complicated shape. This does not take into account savings by elimination of cleaning required to remove buffing compound. No skilled labor is required for barrel polishing.

- **Versatility** — The same barrel can be used to finish parts of any design without loss of time for change of set-up.

- **Bright appearance** — Parts have a bright finish inside and out as they come from the barrel. The surface is clean and white, resists fingerprint-





*Production Manager, Roll-Brite Corp.

FIND OUT ABOUT **IRIDITE** TODAY for finishing ZINC, CADMIUM, ALUMINUM, CUPROUS METALS

WANT CORROSION RESISTANCE? Iridite will give you better-than-specification protection against corrosion.

WANT PAINT ADHERENCE? Iridite provides a firm and lasting base for paint by preventing under-film corrosion.

WANT EYE-APPEAL? Iridite can give you a variety of finishes, depending upon the metal being finished . . . from clear and sparkling bright or military olive drab, to attractive dyed colors.

BEST OF ALL, any Iridite finish is economical and easy to apply.

for example: **IRIDITE** (AL-COAT) REDUCES NEED FOR ANODIZING

Simple chemical dip; immersion time only 10 seconds to 2 minutes; no sealing dip; color is clear or yellow depending upon your requirements; salt spray resistance equivalent to 20 to 30 minutes of anodizing, eliminates need for costly racks and electrical power.

WANT TO KNOW MORE? Write for literature and send production samples for free test processing. See "Plating Supplies" in your classified telephone directory or write direct.

Iridite is approved under government specifications.

ALLIED RESEARCH PRODUCTS
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD

For additional information Circle No. 56 on the Reader Service Card

ing, and retains its brightness longer.

The castings are supported in the barrel during tumbling so that they do not damage themselves and so that they receive an even finish all over. This way, parts can be barrel polished that would be dangerous or impossible to buff. It gives an even finish on all surfaces, with no areas left unpolished for reasons of safety or economy.

While some parts are tumbled loose, this is not practical unless the part is particularly suited for this treatment, i.e., relatively small pieces that are well contoured, without sharp corners.

By supporting the parts in the barrel, they can be positioned in respect to the flow of

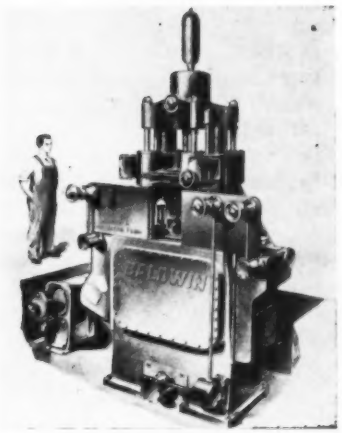
ASSEMBLED die castings are polished as a unit, with uniform bright lustre obtained inside and out.

burnishing material. This is made possible by the specially-designed barrel which is the key to this barrel polishing technique. It permits bulk handling and accurate positioning of parts. Only minor adjustments are required to process parts of different design.

This process does not destroy or damage fine detail, such as can be obtained by engraving fine surface pattern or decoration into the die cavity. Surface treatments that are not

NEW PRODUCTS

For additional information on these products circle key number on reader service card bound in this issue.



MECHANICALLY DRIVEN PRESS . . . designed for powder metallurgy

A new press, rated at 100 tons capacity, has just been announced. The press is a mechanical, four-column, crank-type equipped with a flywheel, pneumatic clutch and pneumatic brake.

Depth of fill and stroke of bottom punch are separately adjustable. The press has been built to give the utmost flexibility possible within the limitations of a single moveable upper and single moveable lower punch. A floating table and floating core rod are incorporated.

Baldwin-Lima-Hamilton Corp.
For more information Circle No. 196 on the Reader Service Card

---

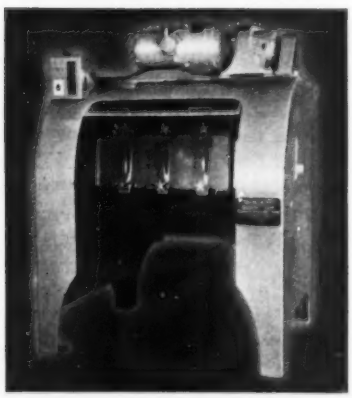
ROTARY ELECTRIC HANDTOOL . . . has high speed and high torque

Featuring sufficient speed and torque to operate midget tungsten carbide mills and burrs, a new electric rotary tool weighs only 35 ounces and is easily held in one hand.

The tool is powered by a 1/5 HP motor and gives spindle speed up to 45,000 RPM. Speed control by stages reduces the spindle speed to a low of 15,000 RPM. Tools and cutters are held in a collet type chuck of the precision draw type similar to lathe collets. Arbors ⅛, 3/16 and ¼ inch in diameter can be accomodated and either mounted or unmounted tools can be used.

Precise Products Co.
For more information Circle No. 197 on the Reader Service Card

---



HEAVY DUTY BARREL . . . designed to remove slag & burrs

Specially designed for the removal of slag from weldments, the burr from flame cutting, and burrs and rust from machine components, a new barrel tumbler with a capacity of up to 2000 lbs. total load has been announced.

The barrel of the standard unit is of welded steel construction lined with a special neoprene rubber. The barrel size is 32 in. diameter and 48 in. long. Numerous safety features have been incorporated in the design to prevent operator injury. The speed is variable from 5 to 30 RPM and the unit has a built in timer leaving the operator free during the deburring cycle and automatically shuts off when completed.

White-Roth Machine Corp.
For more information Circle No. 199 on the Reader Service Card

continued next page

Backstand Belts Triple Production!

Three times as many steel guides sanded per hour using ARMOUR Backstand Belts!

In sanding beveled edges of a steel guide for vending machines, a prominent company* decided to use backstand belts instead of set-up wheels. The switch *increased production from ten to thirty guides per hour!* Here is more proof that Armour backstand belts are more efficient, more economical than set-up wheels.

Belts are only one of the many forms of coated abrasives available to you from Armour. There are more than 30,000 different varieties in grit size, backing, etc. We have sheets, discs, rolls, tubes—and specialty sizes to meet your specifications. Your industrial supply distributor will be glad to tell you about this complete Armour line. Call him today!

Mail the coupon below for your free copy of our useful booklet, "Backstand-Belt Polishing."

*Name of company available on request.

We recommend buying through your industrial distributor.

ARMOUR
Coated Abrasives

MAIL THIS COUPON TODAY!

Armour and Company • North Benton Road • Alliance, O.

Please send me the free booklet, "Backstand-Belt Polishing."

Name..... *Title*.....

Firm.....

Address.....

City..... *Zone*... *State*..... X

For additional information Circle No. 58 on the Reader Service Card

NEW PRODUCTS — cont.

LONGER LIFE ABRASIVE CHIPS . . . for Roto-Finish Processes

Now available to users of Roto-Finish Processes, the new Coruloy "T" chips are described as being extremely fine grained, tougher and longer-wearing than any of the aluminum oxide chips previously offered.

The new chips are said to be particularly useful for fast-cutting operations of both ferrous and non-ferrous parts, particularly when it is necessary to remove a relatively large quantity of metal during a short processing cycle, and when deburring is the primary reason for processing.

Roto-Finish, Inc.
For more information Circle No. 205 on the Reader Service Card

---

CHEMICAL-RESISTANT COATING . . . for severe service conditions

New formulations which can be spray-applied to produce extra-thick chemical-resistant coatings on steel and other metals have recently been developed. These coatings are used to protect equipment against acids, alkalies, salts, oxidizing agents, and many other corrosive agents.

The coating is applied by spray and films of much greater thickness than usual can be obtained. The new coating, used at room temperature, can be applied to cold vertical surfaces to produce single coat dry films up to 20 mils thick. Even at these unusual thicknesses practically no sagging is encountered. Materials previously offered for similar applications usually provided single film dry thickness of about 1 mil, seldom more than 6 mils.

United Chromium, Inc.
For more information Circle No. 203 on the Reader Service Card

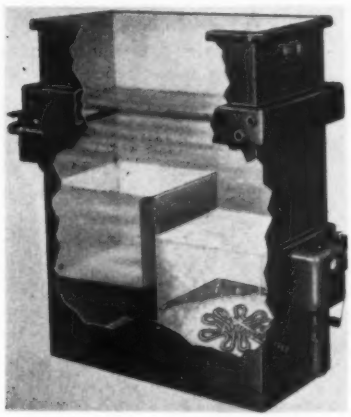
RADIAL HOLE DRILLING
. . . machine accomodates up to 8 drill units

A standard machine which does away with the necessity of building special units for drilling radial holes in a great variety of parts has recently been placed on the market.

Any number of drilling units up to 8 may be employed, the units being movable not only through 360° on the circular table but also movable endwise on riser plates to meet the requirements of the part being drilled. The machine capacity is 1/32 to 3/8 diameter holes. A single momentary contact start button causes all units to operate simultaneously.

Govro-Nelson Co.
For more information Circle No. 201 on the Reader Service Card

---



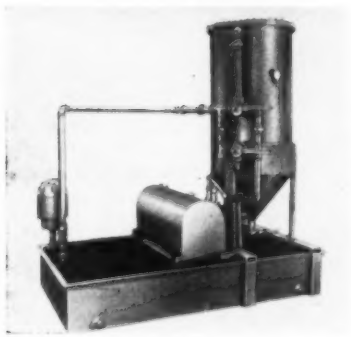
SMALL VAPOR DEGREASER
. . . cleans 200 lbs. of work per hour

A new, compact, vapor degreasing unit is being produced that is capable of processing 200 lbs. of work per hour either in baskets or as individual pieces.

The unit incorporates cool rinse, hot rinse and vapor degreasing because it has both a rinse and boiling sump along with a water jacketed vapor area. Distilled solvent is collected by means of a condensate return trough, passed through a water separator and returned to the rinse sump. The boiling sump is fed by overflow from the rinse sump. Heating of the unit is electrical.

Phillips Mfg. Co.
For more information Circle No 208 on the Reader Service Card

---



COOLANT CLARIFIER
. . . high capacity, low operating cost

This compact, multiple filter-tube unit features over 16,000 square inches of filtering area. It removes all chips, abrasives, dirt and other solid contaminants from both water-based and mineral oil coolants. The filter can be used on either individual machine tools or small central systems.

Clarification of the coolant is accomplished by passing the liquid through multiple filtering tubes suspended vertically within the clarifier housing. The tubes are self-cleaning by backwashing so that they require no manual cleaning or maintenance and provide maximum filtering efficiency at all times.

Honan-Crane Corp.
For more information Circle No. 204 on the Reader Service Card

---

IMMERSION HEATER
. . . for alkaline solutions

A new type of heavy duty, steel-sheathed immersion heater for alkaline bath heating has been announced. According to the manufacturer, the heater is conservatively designed for the safe operating temperature of the nickel alloy resistance element which is covered by a quartz body. Claimed to be the most uniform and efficient protective conductor of heat, this permits longer service life. Low heat density protects both heater and liquids from damage due to carbonization or "frying."

The units have vapor-proof junction boxes and when controlled by a thermostat are in operation only for the period of time required to maintain the desired bath temperature.

Cleveland Process Co.
For more information Circle No. 211 on the Reader Service Card

continued on page 89

REFERENCE MATERIAL

Catalogs and data offered free in this month's ads; to receive copies circle number on reader service card.

1. ELIMINATING STICKING in die casting dies is subject of Reprint DC & Bulletin 426-30J from Acheson Colloids.

2. SCRAP RECOVERY using induction furnaces is discussed in reprint offered by Ajax Engineering.

5. PHOTOMICROGRAPHS, diagrams, performance charts & full technical details of carbonyl iron powders are contained in 32-pg book from Antara Chemicals.

7. ON-GRADE ZINC alloy die castings can be assured under the Certified Zinc Alloy plan described in booklet from American Die Casting Institute.

8. OIL OR WATER can be used in hydraulic pumps or complete central hydraulic sysems for die casting machines detailed in catalog from Aldrich Pump.

9. DIE CASTING MACHINES built by B & T Engineering are subject of catalog which has full specifications.

10. DIE CASTING MACHINES are described in a "feature-by-feature" catalog issued by Cast Master.

11. FLAME-RESISTANT hydraulic fluid for die casting machines is discussed in information bulletin on Lindol HF released by Celanese Corp.

12. DIE CASTING MACHINE, Model 400, built by Cleveland Automatic Machine Co., is subject of a specification bulletin.

15. DIE CASTINGS made by Dollin Corp., and information about the company's facilities, are included in literature offered.

17. DIE CASTINGS BY HOOVER is an informative booklet about the facilities of the company's die casting plant.

20. DIE CASTING MACHINE that handles aluminum, magnesium or brass alloys is subject of spec sheets from Hydraulic Press.

21. MACHINISTS' NIGHTMARE becomes designer's dream is title of booklet on investment casting available from International Nickel Co.

24. DIE CASTING MACHINES built by Kux are presented in an illustrated catalog giving specs on complete line.

25. DIE CASTING MACHINE catalog gives details on Lake Erie machines in capacities from 100 to 1000 tons.

26. DIE CASTING MACHINES suited for various jobs are described and illustrated in catalog from Lester-Phoenix.

27. DIE CASTING MACHINE with new type clamping mechanism is subject of catalog from Lewis Welding & Engineering.

28. TWO-CHAMBER INDUCTION melting furnaces for die casting & other types of non-ferrous casting are subject of bulletin from Lindberg-Fisher.

30. COMPLETELY FINISHED die castings & permanent mold castings from Monarch Aluminum Mfg. Co. are reported in the company's "Fact File".

35. HOW DIE CASTINGS are made by Pressure Casting Co. is described & depicted in booklet "Close-Up of Die Casting."

36. HIGH-SPEED, HIGH-PRESSURE plunger attachment for Reed-Prentice die casting machines is described in bulletin.

37. DIE LUBE SAMPLE offered free by E. M. Scott Chemical Co., to acquaint die casters with No Weld lubricant.

38. THREAD-CUTTING, tapping & drive screws suitable for assembling die castings, & other types of nonferrous castings are described & illustrated in literature from Central Screw.

41. POWDER METALLURGY facilities offered by Thompson Products Inc. are introduced in new booklet MP-532.

42. WHICH ALUMINUM ALLOY to use can be determined by using Alloy Selector offered free by U. S. Reduction.

44. ADVANCED BARREL FINISHING is title of 52-pg catalog offered by Almco Supersheen, along with details on free sample processing & free engineering service.

45. TUMBLING EQUIPMENT line manufactured by Grav-I-Flo Corp., includes barrels, materials and accessory supplies, presented in catalog.

46. SELF-TAPPING SCREWS are subject of guide book offered by Parker-Kalon to help in planning assemblies.

47. COPPER PLATING BATH that minimizes problem of disposing of cyanide wastes is subject of bulletin CU-2 from United Chromium.

48. NON-FERROUS, high-precision castings poured in smooth surfaced plaster molds are described in a booklet listing alloys, physical properties & typical castings made by Alantic Casting & Engineering.

49. INFORMATION about Federated Metals alloys F-4110 which is a silicon-aluminum alloy for die casting, is offered by the company.

51. PRE-ALLOYED chromium-nickel powders that are added to iron powders to produce high strength powdered metal parts, are described in bulletin from Metal Hydrides.

52. HOW TO DIMENSION die castings is subject of booklet for designers offered by Newton-New Haven.

56. IRIDITE for corrosion-protection of zinc, aluminum & other nonferrous metals is subject of literature from Allied Research.

58. BACKSTAND BELT POLISHING is title of booklet telling how to increase abrasive belt finishing output, published by Armour & Co.

59. SELF-TAPPING INSERT bushings that are driven into cored holes to provide torque-resistant screw thread seating, are described in literature from Groov-Pin.

60. BARREL FINISHING data book issued by Minnesota Mining & Mfg. is called "3M Barrel Finishing."

61. ELIMINATING MANUAL or semi-automatic finishing by means of a tumbling barrel is subject of booklet on Roto-Finish machines, equipment & materials.

66. DIE ASSEMBLIES that save construction time in building die casting dies are included in catalog from Detroit Mold Engineering.

67. EJECTOR PINS for die casting dies are subject of data sheet & price list offered by Detroit Mold Engineering.

69. SMALL DIE CASTINGS weighing half ounce or less are subject of brochure from Gries Reproducer.

72. DESIGN DATA for designing aluminum & magnesium die castings is available from Litemetal Dicast.

73. SPECIALTY STEELS for die casting machine parts such as shot sleeves, shot sleeve adapters, etc., are subject of literature from A. Milne & Co.

75. DIE CASTINGS in zinc & aluminum alloys, as cast by Paramount Die Casting Co., are subject of literature offered by the company.

76. ALUMINUM ADDITIONS for melts of zinc alloy used in die casting are described in literature about Z-shot from George Sall Metals.

79. PRESSES FOR POLYSTYRENE patterns used by investment casters are presented in catalog from Van Dorn Iron Works, builders of injection molding equipment.

81. METAL CLEANING information is offered by Oakite in a booklet "Some Good Things to Know about Metal Cleaning."

82. OVER 1000 SHOTS per hour on small, high-speed die casting machine is claimed for unit described in engineering data book A-10 from A. B. C. Die Casting Machine Co.

continued next page

GLOBE DIRECT DRIVE TILTING BARREL Controls Tumbling for . . .

- BIGGER LOADS
- FINER FINISH
- LOWER COSTS

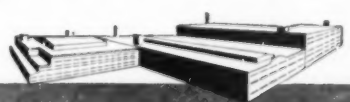
Available in Kiln-Dried Maple or Steel Shells

Globe tilting barrels save labor and time because they will take bigger loads and finish them faster. In many instances use of Globe Precision Barrels has eliminated costly hand operations. Globe's exclusive "work shifting" bottom gives complete agitation for uniform high-quality work.

Low speeds for non-ferrous and plastic parts assure quality finish without scratching or marring.

FREE EXPERIMENTAL SERVICE

Hupp's experimental laboratory is at your service. Send samples of parts to be processed and finished part. Hupp will analyze your finishing needs and make cost-saving recommendations. No charge or obligation. Write Today.



HUPP CORPORATION
GLOBE STAMPING DIVISION
1250 WEST 76th STREET • CLEVELAND 2, OHIO
SERVING INDUSTRY SINCE 1902

For additional information Circle No. 80 on the Reader Service Card

THE SKY'S THE LIMIT IN SAVINGS WHEN YOU *Roto-Finish* PRECISION PARTS

Tedious, hand or semi-mechanical finishing of precision parts takes time . . . costs money. With the original Roto-Finish process, using Roto-Finish machines, chips and compounds, one man can finish hundreds of parts *at one time* . . . to exact tolerances. The illustrated parts show the diversity in *size*, shape and material in the parts that are *now* precision finished by the Roto-Finish process.

To determine your requirements Roto-Finish maintains a completely equipped laboratory which can (and does) process parts to your specifications. The results we obtain are guaranteed to be duplicated in your plant. This sample processing service is yours without obligation. Just send a few unfinished parts . . . along with a finished part as a guide, for prompt recommendation of the correct Roto-Finish process that exactly fits your requirements.

write for fact-packed Catalog

Inquire about Roto-Finish Special Machines and Equipment for specific applications.

Roto-Finish COMPANY

associated with The Sturgis Products Co.
3716 MILHAM ROAD, KALAMAZOO, MICH.

P. O. Box 988—
Phone 3-5378

FOREIGN REPRESENTATIVES: CANADA — Windsor — Roto-Finish Canada Limited • ENGLAND — London — Roto-Finish Limited — 39 Park Street — Mayfair • AUSTRALIA — Melbourne — A. Flavell Pty, Ltd. • HOLLAND — Delft — N. V. Roto-Finish Maatschappij — Rotterdamse — WEG 370A • AUSTRIA, GERMANY, SWITZERLAND — Frankfurt a.M. — Metallgesellschaft A.G., Germany • ITALY — Milan — Societa Roto-Finish a R.L. — Sesto S. Giovanni — Viale E. Marelli 31 • FRANCE — Paris — Societe Roto-Finish, 70 rue de la Republique-Puteaux (Seine) • BRAZIL — Rio de Janeiro — Commercial E. Industrial de Formes Werca, Ltds.

For additional information Circle No. 61 on the Reader Service Card

REFERENCE MATERIAL — Cont.

84. ALLOYS FOR INVESTMENT castings are produced to specification in alloy service introduced in literature from Cannon Muskegon.

88. SINTERING FURNACES manufactured by Harper Electric Furnace Co. are subject of catalog offered by the company.

89. ENGINEERING DATA book on powder metallurgy is offered for designers by International Powder Metallurgy.

94. STAINLESS STEEL LADLES for die casting & permanent mold casting are described in literature from Spincraft.

96. FINISHING DIES for die casting by means of liquid abrasive blast is reported in bulletin on Hydro-Finish available from Pangborn.

97. BARREL POLISHING system for bright finish on aluminum die castings is described in literature from Roll-Brite.

101. THREAD-CUTTING FASTENERS are subject of literature on Springtites & Sems issued by Eaton Reliance Div.

102. MACHINE DEBURRING with tools made by No-Bur can be learned in brochure offered by the company.

103. GRINDER-MILLER with machine tool mount does many tool room and production jobs. Unit described in catalog from Precise Products.

104. DIE CASTINGS produced by Jersey Plastic & Die Casting, along with informaion about the company's facilities, are presented in literature.

106. DIE CASTINGS from Racine Die Casting Co. are featured in a new brochure.

107. CARBIDE ROTARY BURRS and files for die & production work are listed and described in general catalog from Severance Tool Industries.

109. SMALL DIE CASTING machines set up for rapid production of die castings, are presented in catalog from DCMT Sales.

USEFUL LITERATURE

To receive copies of the publications described here circle key number on reader service card bound in this issue.

PROCESSES

Graphite Engineering Material: 144
The uses, engineering properties, forms available, etc. of Graphitar are fully described in a new 66 page catalog that has recently been released by the U. S. Graphite Co., Div. of The Wickes Corp.

Investment Cast Surgical Instruments: 145
The use of investment casting in the manufacture of surgical instruments, particularly a new stomach suturing apparatus, is described in a recent issue of Nickel Topics, published by the International Nickel Co.

MATERIALS & EQUIPMENT

Grinding and Mixing Equipment: 151
A bulletin of the Sprout-Waldron & Co. describes the grinding, separation, mixing and conveying equipment manufactured by that company. All of the equipment is for bulk handling of dry materials.

Rotary Tool Catalog: 152
A new and enlarged catalog of rotary tools for use with flexible shaft machines and the Diskette, portable electric tool has been issued by the Franklin Balmar Corp.

Milling Cutters & End Mill Holders: 153
A new 52-page catalog describing all of their standard, solid, high speed steel milling cutters and end mill holders is available from Goddard & Goddard Co. The catalog covers 147 different sizes recently added to their standard end mill line. Other new equipment is also described.

Uses For Wire Thread Inserts: 154
A two color, 22-page, catalog by Heli-Coil Corp. describes the uses of wire screw thread inserts in design, production salvage and maintenance. Photographs, line drawings, text and tables explain wire screw thread insert use in all materials to provide higher loading strengths and greater resistance to wear, seizing, stripping, galling and corrosion.

Iron Powder: 155
A leaflet describing the new RZ iron powder to be produced by Easton Metal Powder Co. is now available. Illustrated are typical RZ iron powder particles; some suggestions for use are also made.

High Temperature Tube Furnace: 156
A small, high temperature tube furnace for research laboratory use is described in a leaflet issued by the Harper Electric Furnace Corp. Suggested uses and operating characteristics are given.

New 400-Ton Die Casting Machine: 157
Just announced in the Lester Press is a new 400-ton die casting machine. The machine has 24 x 29½ die platens and will handle a 6-⅜ pound shot, according to the manufacturer, Lester-Phoenix, Inc.

Aluminum Pigments: 158
For those having the Metals Disintegrating Co. Blue Book, a new data section is available on the properties and uses of aluminum pigments and aluminum grain.

Furnace & Oven Control Instruments: 159
A new catalog of control instruments for furnaces, ovens, dryers and kilns has just been published by the Bristol Co. The catalog features Electronic Dynamaster potentiometer and millivoltmeter type pyrometer controllers, recorders and indicators.

Toggle Switches & Switch Assemblies: 160
Catalog from the Micro Div. of Minneapolis-Honeywell Regulator Co. describes and illustrates the toggle switch and toggle switch assemblies made by the company.

Beryllium and Its Alloys: 161
In an 18-page booklet, the Beryllium Corp. describes all of its standard products. Compositions, shapes and sizes available, properties and some suggested uses are included.

Silicone News: 162
Fact and fantasy, in equal amounts, are amusingly presented in Tall Tales and Fabulous Facts presented by the Dow Corning Corp. concerning uses for silicones.

Vacuum Furnaces & Their Applications: 163
The high vacuum processing of metals is described and illustrated in a four-page booklet prepared and available from the F. J. Stokes Machine Co.

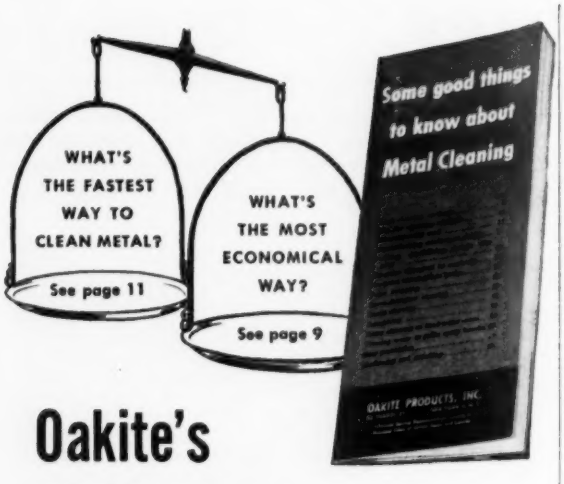
Core Binder Resin: 164
Resimene 970, a urea resin core binder for foundry use, is described in a booklet prepared by Monsanto Chemical Co. Plastics Div. The booklet, containing 17 pages, includes sections on production techniques, preparation of mixes, foundry formulations and trouble shooting in the core room.

FINISHING

Electrolytic Stripper For Zinc Die Castings: 170
The properties, applications and methods of use of Compound L-88 for removing electro-deposited coatings fronm zinc die castings are given in some new literature available from Enthone, Inc.

Chromium Plating Solutions: 171
The properties of chromasol plate deposited from chromasol solutions are given in a pamphlet published by the Industrial Chrome Div. of Ward Leonard Electric Co.

continued next page


WHAT'S THE FASTEST WAY TO CLEAN METAL?
See page 11
WHAT'S THE MOST ECONOMICAL WAY?
See page 9
Some good things to know about Metal Cleaning
OAKITE PRODUCTS, INC.

Oakite's FREE Booklet on Metal Cleaning

answers many questions that mean better production, more profit for you. Just look at the table of contents:

- Tank cleaning methods
- Electrocleaning steel
- Electrocleaning nonferrous metals
- Pickling, deoxidizing, bright dipping
- Pre-paint treatment in machines
- Pre-paint treatment in tanks and by hand
- Paint stripping
- Machine cleaning methods
- Steam-detergent cleaning
- Barrel cleaning
- Burnishing
- Better cleaning in hard-water areas
- Treating wash water in paint spray booths
- Rust prevention
- Machining and grinding

FREE Write for your copy of this 44-page illustrated booklet.

Technical Service Representatives Located in Principal Cities of United States and Canada

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

OAKITE PRODUCTS, INC.
34-G Rector St., New York 6, N. Y.

Send me a copy of your booklet *"Some good things to know about Metal Cleaning"*

NAME.....

COMPANY.....

ADDRESS.....

For additional information Circle No. 81 on the Reader Service Card

USEFUL LITERATURE — cont.

Economics of Painting: 172
A leaflet by Carboline Co. Div., Mullins Non-Ferrous Casting Corp., gives scientific data for buyer and maintenance engineer on basic economy in purchasing and using paint for protection against corrosion.

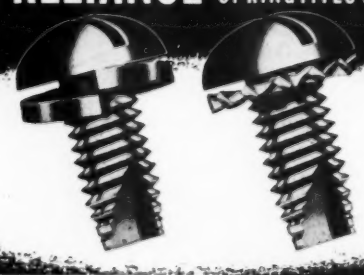
Barrel Cleaning: 173
Pangborn Corp. has revised its Blastmaster Rotoblast bulletin to include specification information on newly announced sizes of the Blastmaster airless cleaning barrel. Special features of the equipment and suggested uses are contained in a 12-page illustrated booklet.

Industrial Filtration: 174
A new eight-page brochure by the U. S. Hoffman Machinery Corp. graphically presents the essential features and applications of their ten basic types of industrial filtration equipment.

Flaw Detection: 175
The detection of surface cracks, checks and other imperfections by means of surface-active dye materials is fully described and illustrated in a brochure that is available from Turco Products, Inc.

Heavy Duty Cleaning Detergent: 176
A special field service report on the uses of Composition 26 has just been published by Oakite Products, Inc. The new material is a special detergent particularly compounded for heavy duty work.

• ELIMINATE TAPPING COSTS
• REDUCE ASSEMBLY TIME
• BALANCE INVENTORIES
WITH **RELIANCE** "THREAD CUTTING" SPRINGTITES and SEMS



Pre-assembled Springtites and Sems Especially Designed For Use with Die-Castings

Available with or without washers

SEND TODAY FOR FREE ENGINEERING BULLETIN S49A

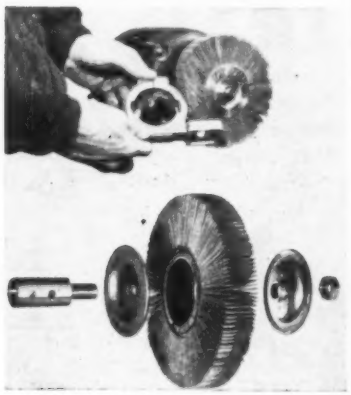
RELIANCE DIVISION
EATON MANUFACTURING COMPANY
OFFICES AND PLANTS • MASSILLON, OHIO
SALES OFFICES:
NEW YORK • CLEVELAND • DETROIT • CHICAGO
ST. LOUIS • SAN FRANCISCO • MONTREAL

For additional information Circle No. 101 on the Reader Service Card

continued from page 83

FLEXIBLE GRINDING WHEEL . . . features abrasive cloth leaves

For light grinding and polishing, flash and parting line



removal on die castings, and for polishing irregular surfaces, a new type of grinding wheel is now available.

Featuring hundreds of abrasive cloth leaves, the new grinding wheel is said to be capable of light polishing and metal removal without the danger of digging-in such as can occur with rigidly backed abrasive equipment. A further advantage claimed for the wheel is its ability to get into irregularly shaped openings.

Merit Products, Inc.
For more informaion Circle No. 198 on the Reader Service Card

---

IMPORTED DIAL INDICATOR . . . with jeweled bearing

A precision instrument of high quality and fine workmanship, this dial indicator is said to give more precise readings. Jeweled bearings give greater accuracy. Furnished with a universal shank, the indicator is graduated in 0.0001 increments. It is compact, versatile, and adjustable to all positions so that the user can hit inaccessible places.

Homestrand, Inc.
For more information Circle No. 210 on the Reader Service Card

continued on page 91

AUTHORIZED HONITE DISTRIBUTORS
Sales and Service

Micro Deburring Co. Chicago, Ill.
Mechanical Finishing Co. Cincinnati, Ohio
Metal Finishing Corp. Hazel Park, Mich.
Metal Parts Processing Co. Newark, N. J.
Metal Finish, Inc. Newark, N. J.
M. E. Baker Co. Cambridge, Mass.
Tumbling Products, Inc. Indianapolis, Ind.
Deburr Co. Philadelphia, Pa.
Gerell Mfg. Co. Cleveland, Ohio
Mosher Co. Chicopee, Mass.
Precision Tumbling & Supply Co. Stratford, Conn.
Sundmark Supply Co. Los Angeles, Calif.

These HONITE distributors are experts who have had years of experience in barrel finishing. Your local distributor is equipped to give you complete service on every phase of barrel finishing: equipment, Honite chips and Honite compounds.

He'll show you that HONITE is the longest-lasting, fastest-cutting natural barrel finishing abrasive available today. You'll see that no other barrel finishing abrasive—not even granite—retains its cutting edges as long as HONITE!

He'll show you why low-priced HONITE is not only best, but most economical for fine finishing to close tolerances, and for many other jobs involving a minimum amount of metal removal.

Ask about SUPER-HONITE
World's *Toughest* Abrasive Chip

Only chip engineered for *both* grinding and burnishing. Made of super-hard aluminum oxide mineral grains fused with a ceramic bonding agent. Gives high luster finish in jig time because chips never crumble or pulverize.

Write today for free copy of "3M Barrel Finishing" . . . filled with helpful information on increased efficiency, lower costs.

Address Minnesota Mining & Mfg. Co., Dept. PM-93, St. Paul 6, Minn.

Name.....Title.....

Company.....

Address.....

City.....Zone...State.....

Made in U.S.A. by Minnesota Mining & Mfg. Co., St. Paul 6, Minn.—also makers of "Scotch" Brand Pressure-Sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Abrasives, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N. Y. In Canada: London, Ont., Can.

3M

For additional information Circle No. 60 on the Reader Service Card

when you THINK of FASTENERS think of CENTRAL...

CENTRAL MAKES EVERY TYPE FOR ALL DIE-CASTING ASSEMBLIES!

TYPE "1" THREAD CUTTING

Better for metal where a thread cutting action supercedes thread forming. Type "1" Central Thread Cutting Screws drive with minimum torque to form a perfectly mated thread and a tight fit. Interchangeable with standard machine screws.

TYPE "23" THREAD CUTTING

Note the wide thread cutting slot that works better in softer metals such as aluminum and zinc, or in harder metals where the wide slot affords better cutting advantages.

TYPE "25" THREAD CUTTING

Here the exclusive wide flute cutting slot combines with a specially spaced thread for low driving torque, high resistance to stripping and extra-free cutting action. Ideally suited to soft metals and plastics. Write for full details.

DRIVE SCREW TYPE "U"

TYPE "A" TAPPING SCREWS

Pointed and augur-like, the Central Type "A" Tapping screw pulls and forms thinner (.015" to .050") sheets of metal into a matching threaded section from punched, drilled, or nested holes. Available with slotted, Phillips, clutch or hexagon heads.

TYPE "B" TAPPING SCREWS

Die-pointed and augur-like for thicker metal (.050" to .200"), Central Type "B" Tapping Screws pass through a hole in one piece, form their own threads to lock both parts securely. For porous castings, non-brittle plastics, fibre and asbestos materials.

TYPE "C" TAPPING SCREWS

Recommended for general use in metals from .030" to .100" thickness. Standard pitch thread interchangeable with standard machine screws. Ideal for chip-free assemblies. Second assemblies can be made on projected end of the screw.

"You Can Depend on Central"

CENTRAL SCREW COMPANY

3501 SHIELDS AVE., CHICAGO 9, ILLINOIS

3028 E. ELEVENTH ST., LOS ANGELES 23, CALIF. • 149 EMERALD ST., KEENE, N. H.

For additional information Circle No. 38 on the Reader Service Card

NEW PRODUCTS
continued from page 89

operated on from 30 to 120 psi line pressure.

Kelite Products, Inc.
For more information Circle No. 202 on the Reader Service Card

SMALL PARTS WASHER . . . operated by air power

Quick, automatic cleaning of small parts, complete assemblies and tools is made possible by a new air-powered washer now being produced. Cleaning of small parts or complete assemblies is achieved by the action of an oscillating turntable which is submerged in a cleaning solution. Parts to be cleaned are placed in a perforated basket, while complete assemblies are placed directly on the turntable.

An integral part of the machine is the solvent saving drain tray, which catches the solution drained from the cleaned parts and returns it to the tank. The air motor is

ADJUSTABLE MACHINE CLAMP . . . for machine tables with T-slots

To eliminate makeshift set-ups and lower set-up time a new table clamp has been designed and put on the market.

Featuring an adjustable height arrangement such that only one bolt and no blocks are required, the clamp is easily and quickly adjusted for a wide variety of work. The clamp consists of a hardened T-slot bolt and flange nut, a cast clamp post and two interchangeable cast clamping arms. One arm is designed for high clamping and the other one for low clamping. High tensile castings are used through-out. After quick

continued next page

Barrel Polish
your Aluminum Die Castings
by a NEW method for a NEW finish

● Produce a brighter — whiter — more durable finish at greatly reduced cost over hand polishing methods.

See Samples of Roll Brite Finish at Booth 619-A, National Hardware Show, Oct. 5th to 9th.

● *Let us Roll-Brite one of your aluminum Die Castings at no obligation to you or send for copy of bulletin describing the advantages of Roll-Brite.*

ROLL BRITE Corporation
231 FERRIS AVENUE • WHITE PLAINS, N. Y.

For additional information Circle No. 97 on the Reader Service Card

BECAUSE Hydro-Finish employs fine mesh abrasives suspended in water, it does a precision cleaning job without danger of excessive metal removal. Tolerances are held to .0001"! Result: more years of service from your dies!

What's more, Hydro-Finish saves you time and labor. Operated by one man, it removes scale and discoloration in *minutes* instead of hours! Cleaned surfaces are virtually free of directional grinding lines, eliminating or reducing further finishing operations.

Get the facts on how Hydro-Finish can save you money! Write today for Bulletin 1400A. Address: PANGBORN CORPORATION, 3500 Pangborn Blvd., Hagerstown, Md.

Get **PANGBORNITE.** Best abrasive for all liquid blasting needs. Available in many mesh sizes.

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment.

Pangborn
BLAST CLEANS CHEAPER
with the right equipment for every job

Circle No. 98 on the Reader Service Card

INDEX OF ACP CHEMICALS FOR METAL PRESERVATION AND PAINT PROTECTION

METAL	OPERATION	ACP CHEMICAL
ALUMINUM	Cleaning	"DEOXIDINE" "DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Preparation for Painting	"ALODINE" "DURIDINE" "DEOXIDINE"
	Protection from Corrosion	"ALODINE"
GALVANIZED IRON, ZINC, AND CADMIUM	Cleaning	"DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Corrosion Proofing	"ZINODINE"
	Paint Bonding	"ZINODINE"
	Phosphate Coating, in Preparation for Painting	"LITHOFORM"
	Soldering Flux	"FLOSOL"
STEEL	Chromate Coating, in Preparation for Painting	"CROMODINE"
	Cleaning	"ACP RIDOLINES AND RIDOSOLS"
	Cleaning for Painting	"DEOXIDINE" "DURIDINE"
	Coating with Copper	"CUPRODINE"
	Drawing and Extrusion	"GRANODRAW"
	Paint Bonding	"CROMODINE" "DURIDINE" "GRANODINE" "PERMADINE" "THERMOIL-GRANODINE"
	Paint Stripping	"CAUSTIC SODA AND SOLVENT NO. 3"
	Phosphate Coating, in Preparation for Painting	"DURIDINE" "GRANODINE" "PERMADINE" "THERMOIL-GRANODINE"
	Phosphate Coating, to Protect Friction Surfaces	"THERMOIL-GRANODINE"
	Pickling with Inhibited Acids	"RODINE"
	Rust Prevention for Unpainted Iron	"PEROLINE"
	Rust Proofing	"PERMADINE" "THERMOIL-GRANODINE"
	Rust Removal—Brush, Dip, or Spray	"DEOXIDINE"
	Soldering Flux	"FLOSOL"

Visit Our Display in
Space 1104
Main Exhibition Hall
Cleveland
Public Auditorium
at the
National Metal Exposition
October 19th - 23rd

CHEMICALS ACP PROCESSES

AMERICAN CHEMICAL PAINT COMPANY

GENERAL OFFICES: AMBLER, PENNSYLVANIA

Detroit, Michigan Niles, California Windsor, Ontario

For additional information Circle No. 57 on the Reader Service Card

height adjustment of the arm on a ratchet post, a few turns of the nut clamp the work securely to the table.

Clamp-All Co.

For more information Circle No. 200 on the Reader Service Card

---

SELF PRIMING FILTER PUMP . . . holds particles down to one micron

For filtering corrosive liquids, such as are encountered in plating and anodizing, a filter pump is available that will handle practically any solution from pH 0 to pH 14. The pump and associated filter may be used for either aqueous or non-aqueous solutions and will remove particles down to 1 micron in size.

The pump is fabricated from type 316 stainless steel with a neoprene impeller. Suction lift is 15 feet and on open pumping delivers 6 gal./min. On closed pumping the unit will develop 40 psi. Filters can be supplied in cotton, dynel, porous stone or porous carbon.

Sethco Mfg. Co.

For more information Circle No. 209 on the Reader Service Card

---

STRIPPABLE PLASTIC COATING . . . for metal protection

A new, fast drying, tough, strippable coating has been developed and marketed. It is supplied as a solution, easily applied by dipping, brushing or spraying. The coating is insoluble in water even in very thin gauges.

The coating, known as CD Strip 100, is now used for the protection of aluminum and other metals during general fabrication and for the general protection of glass, phenolic laminates and similar surfaces. The coating is air drying.

The coating is bright red in color so that treated areas are readily identified. Removal is easy, when desired, by stripping or peeling back the entire coating in one piece.

Chemical Development Corp.

For more information Circle No. 207 on the Reader Service Card

SILVER ANNIVERSARY
continued from page 47

Casting Corp. of Mt. Vernon, N. Y.

Newton Die Casting Corp. of New Haven, Conn. (now Newton-New Haven); Parker White Metal Co. of Erie, Pa.; Perfection Die Casting Corp. of Cleveland (no longer in business).

Phoenix Die Casting Co. of Buffalo, N. Y.; Precision Castings Co. of Syracuse, N. Y.; and Republic Die Casting Co. of New York City (no longer in business).

Sterling Die Casting Co. of Brooklyn, N. Y.; Superior Die Casting Co. of Cleveland; Twin City Die Casting Co. of Minneapolis; and White Brass Casting Co. of Chicago (no longer in business).

A list of officers of the Institute is presented.

What has been accomplished during these 25 years is not simple to list, but covers fields of cost accounting, relations between die casters and the government, war effort, industrial research, labor relations, technical research, plant safety, information and publicity, and many other topics. Here is a skeleton outline of Institute work.

1928 Founding of the Institute.

1929 First formal organization; first annual meeting with panel discussions of industry problems.

1930 Statistical programs started relating to sales and dies.

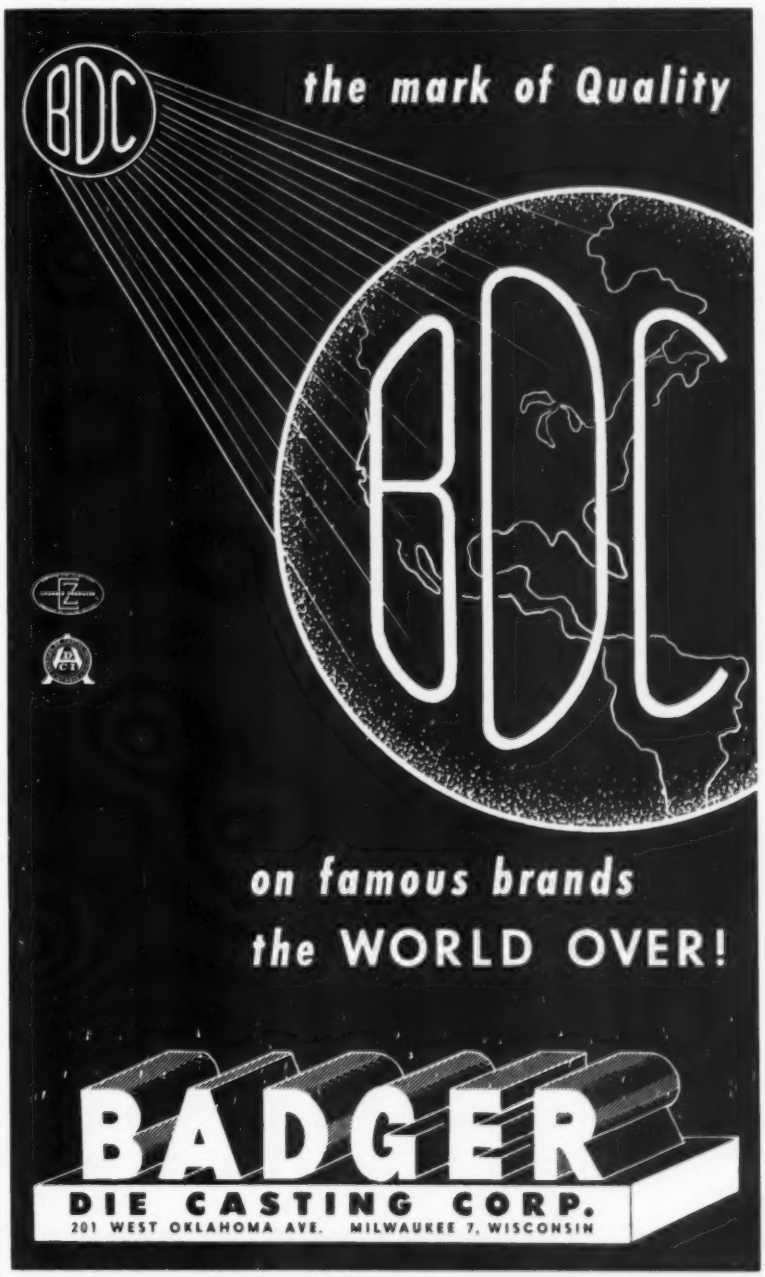
1932-1933 The NRA Code Authority, with the first effort to set up standardized cost accounting.

1934 Publication of the booklet, "Operating Trends in the Die Casting Industry" written by John Hall of the United States Department of Commerce at the request of the Institute.

1940 Washington Committees started to deal with Walsh Healy Act and other problems relating to Government regulations or problems.

1941 With the start of the war, it was necessary to gain approval for the existence of the industry and to obtain defense business. A committee was formed under chairman Walter Goldhamer of Superior Die Casting Co. to appear before the Truman Committee and to gain approval from OPM for continued operation of the die casting establishments. This year also saw the start of the Ordnance Industry Advisory Committee.

continued next page



For additional information Circle No. 64 on the Reader Service Card

biological specimens

.000 000 98425

INCH THICK

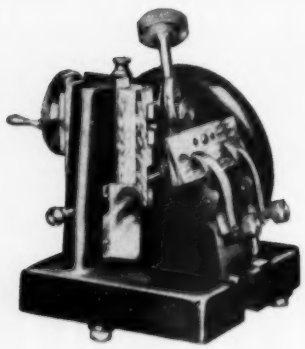
cut with the

MICROTOME

which uses

11 HITCHINER

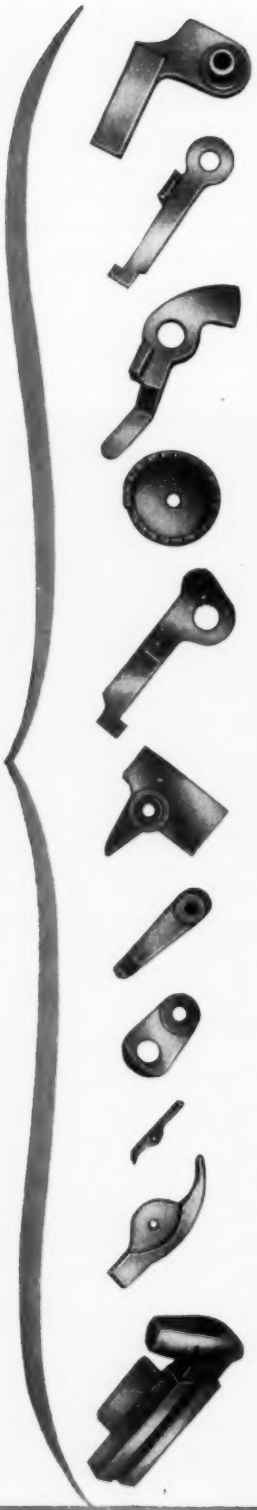
precision investment CASTINGS



International Equipment Co., Boston, Mass., manufactures the Microtome shown and other precision instruments. For the Microtome, they chose Hitchiner precision investment stainless steel castings because they could get extremely accurate parts with a minimum of machining. These castings also lend themselves to the very high, bright, smooth finish necessary on instruments of this quality.

Whatever your requirements may be in small castings, we will be happy to have you utilize our facilities and experience in solving your parts problems. Quotations furnished promptly on receipt of your prints.

Be sure to see us at Space 2422, The National Metal Show



HITCHINER Manufacturing Company, Inc.

MILFORD 7, NEW HAMPSHIRE

Representatives in principal cities.

For additional information Circle No. 50 on the Reader Service Card

SILVER ANNIVERSARY — Cont.

1942 Industry Advisory Committees were set up to help OPA and WPB.

1943 Continuation of the Washington effort was most important during this time, W. J. During of Precision Castings Co., chairman of the Industry Advisory Committee, received a citation from the Ordnance Department.

1944 A Pacific Coast Group of the Institute was founded. The Ordnance Distinguished Service Award was given to the American Die Casting Institute.

1945 An Institute insignia was adopted. A new statistical program was launched dealing with the use of metal and another dealing with plant safety. The Die Casting Industrial Research Foundation was started in 1945, and that year also saw the first labor relations activity of the Institute.

1946 The Institute published a booklet, "Introduction to Die Casting," designed to acquaint engineers, designers and students with the die casting process and die castings.

1947 The Die Casting Industrial Research Foundation was merged into the Institute and the labor relations program also became a regular part of the Institute's activities. In this year, a new Industry Advisory Committee to Frankford Arsenal was set up.

1948 To guarantee the quality of zinc alloy die castings, the Institute's Certified Zinc Alloy Plan was set up and put into operation. Members voluntarily agreed to meet specified standards of analysis and to submit to an inspection system to ensure conformity.

1949 The Annual Doehler Award for the outstanding contribution to the die casting industry was set up, and the Institute was made trustee for the award fund. The Institute's Safety Committee was

organized. Work of the Institute in connection with the American Society for Testing Materials resulted in issuance of B240, the zinc alloy ingot specification.

1950 A revised and up-to-date Standard Cost Accounting Procedure for the Die Casting Industry was issued. For the first time, the Institute issued a cross reference manual of all principal nomenclature used to identify die casting alloys.

The Institute continued its cooperation with the Government by acting as agent for Frankford Arsenal in the development of further industry information. The Doehler Award in this year went to C. R. Maxon of New Jersey Zinc Co. for gaining acceptance of zinc die castings by the Army Engineer Corps for use in the Panama Canal Zone.

1951 Committees were set up to advise NPA and OPS. The Institute's large Safety Manual for the Die Casting Industry was published. The Safety Committee which prepared the manual was given the Doehler Award.

1952 The Institute sponsored formation of the Die Casting Research Foundation. The Doehler Award was given to David Laine, Institute secretary.

DIE LUBRICANTS
continued from page 52

ricating properties at high temperatures. Fluorocarbons leave little or no carbonaceous residue when thermally decomposed. At present, silicones and fluorocarbons are expensive.

Molybdenum disulfide (sometimes referred to as molybdenite) possesses some very interesting characteristics as a die lubricant, and is superior to graphite with respect to staining. It will withstand temperatures up to 1200 F for short periods of time. Thus far, a completely satisfactory vehicle for it has not been found, although a glycol derivative which volatilizes at 800F with less than 0.1 percent carbon is reported to give good results.

A class of lubricants which has recently come into prominence is the polyalkylene glycol type. They have high flash points, and when pyrolyzed, the resulting products are gaseous, so that no carbonaceous residue remains. The polyalkylene-glycol lubricants possess excellent antiwear properties, good load-carrying capacity, stability at elevated temperatures, and unusual resistance to sludge and varnish formation.

continued next page

"Cleveland" Die Castings
of Zinc or Aluminum
Precision-made
to reduce your
finishing and
assembly time
"Cleveland" will work with your engineers to develop matched designs for assembly with minimum or no machining. Prompt quotations and honest effort to meet delivery requirements.
Member of "The Certified Zinc Alloy Plan".
THE CLEVELAND HARDWARE AND FORGING COMPANY
3256 East 79th Street, Cleveland 4, Ohio
Our 72nd Year of Business
For additional information Circle No. 65 on the Reader Service Card

Over the past several years, the temperature requirements for lubricants in the aircraft industry have been pushed to higher and higher limits. At the present time, satisfactory operation up to 500F is specified, and planning in the turbojet aircraft field requires lubrication at temperatures of 750F, for use in the near future. Long-range planning visualizes a requirement of 1000F. No lubricants are in existence at this time that can meet these two higher temperature requirements. It does not seem likely that the range of organic-based lubricants can be pushed much higher; hence, a radically new approach to the problem is necessary.

There are indications that the most probable field for expansion will be in the development of inorganic lubricants. In a sense, graphite and molybdenum disulfide are inorganic lubricants even though they are many times used with an organic vehicle. Very little work has been done in the field of inorganic lubricants, so there is little information on which to base selection of materials for initial investigation. However, applying the knowledge available on the application of inorganic materials in other fields, several possibilities appear interesting.

Boron nitride is known to have a crystal structure similar to that of graphite, and it is thus assumed that it would possess similar lubricating properties. Its properties as a die lubricant, of course, are unknown.

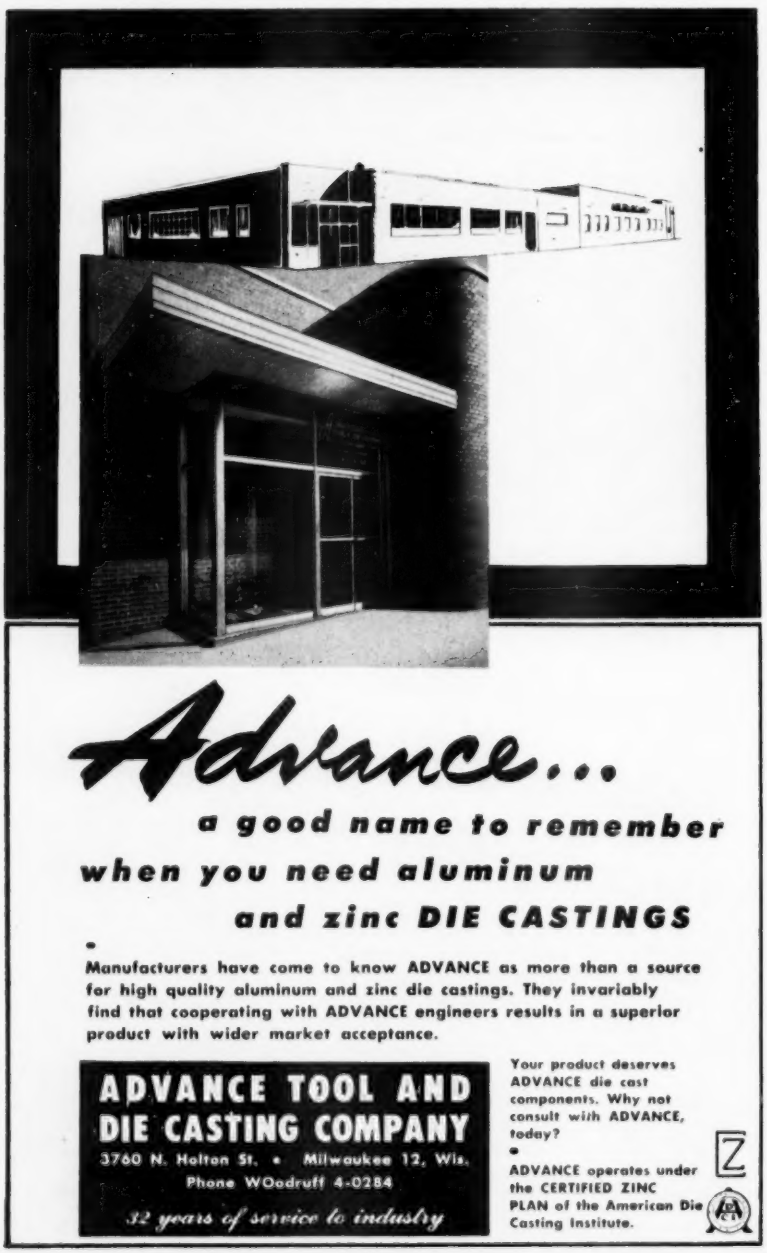
Butyl titanate, which is not strictly an inorganic material, can be sprayed on red-hot metal with the resultant formation of a thin film of titanium dioxide, which is very adherent and resistant to temperature change; this film should function as an excellent protective coating for the die surface.

Silicates are a class of compounds which are known to form films; they exhibit good high-temperature stability and should provide good protection to the die surface against oxidation.

Phosphates are similar in many respects to silicates, and formulations can be developed which would probably react chemically with the surface of the die to form thereon a tightly adherent phosphate coating which would lend protection to the die surface.

Another approach to the problem might be the development of low-melting eutectics, composed of inorganic materials, which would be fluid over the temperature range required.

It is probable that other ideas and approaches to this problem would become obvious as the program proceeded


Advance...
a good name to remember
when you need aluminum
and zinc DIE CASTINGS
Manufacturers have come to know ADVANCE as more than a source for high quality aluminum and zinc die castings. They invariably find that cooperating with ADVANCE engineers results in a superior product with wider market acceptance.
ADVANCE TOOL AND DIE CASTING COMPANY
3760 N. Holton St. • Milwaukee 12, Wis.
Phone WOodruff 4-0284
32 years of service to industry
Your product deserves ADVANCE die cast components. Why not consult with ADVANCE, today?
ADVANCE operates under the CERTIFIED ZINC PLAN of the American Die Casting Institute.

For additional information Circle No. 63 on the Reader Service Card

OPPORTUNITIES

WE NEED a young man with technical background, preferably powder metallurgy, to develop markets for interesting group of alloy powders.
Will travel extensively following training period. Please write, outlining experience, background, and salary requirements to Personnel Director, METAL HYDRIDES INCORPORATED, Beverly, Massachusetts.

DIE CASTING ENGINEER: to assist in engineering and sales of a leading line of die casting machines. Engineering training and practical die casting experience essential. Our employees know of this ad and all replies will be treated in confidence. Write Box 9153, Precision Metal Molding.

DESIGN ENGINEER: familiar with non-ferrous extrusion operations and processes for equipment design Write Box 9253, Precision Metal Molding.

MANUFACTURER'S AGENT — well established and aggressive with offices in Detroit, desires to represent competent die casting company producing zinc or aluminum parts. Have clientele of A-1 steady customers. Write Box 9353, Precision Metal Molding.

PRODUCTION EXECUTIVE WANTED — Man experienced in production of sintered metal powder parts to take charge of production. Must be capable of developing an efficient powder metal fabricating operation. Prefer one with experience in bearings and structural parts. Must be willing to relocate. Address your reply to Box 9453, Precision Metal Molding Magazine.

FOR SALE: — Zinc Die Casting Machine. No. 2 Reed-Prentice Machine. Machine can be seen in production. Write Box 9553, Precision Metal Molding Magazine.

FOR SALE: — Die Casting machine — Lester HHP-1 for zinc. Beam frame, excellent condition. Reasonably priced for immediate sale. Lester Castings, Inc. 3170 West 33rd St., Cleveland, Ohio.

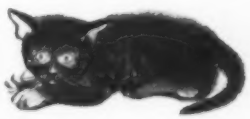
WANTED: — Reed Prentice 1½ die casting machine, Late model either cold or hot chamber. State price and condition. Write Box 9653, Precision Metal Molding Magazine.

COMMISSION SALESMAN: for New England and New York area, aluminum and zinc die castings. Write Box 9753, Precision Metal Molding.

If Your Product Requires

The Strength of a Panther

But Must be the Size of a Kitten . . .



Use **M H Chromium-Nickel Pre-alloyed Powders**

Very small amounts of Metal Hydrides' chromium-nickel pre-alloyed powders combined with iron powders, can mean volume production of small and intricate parts having high tensile strength.

Write now for complete information on properties of iron powders with alloys of varied chromium-nickel contents. Your inquiries will receive prompt, interested attention. Ask for Bulletin 800-A.

M H

METAL HYDRIDES

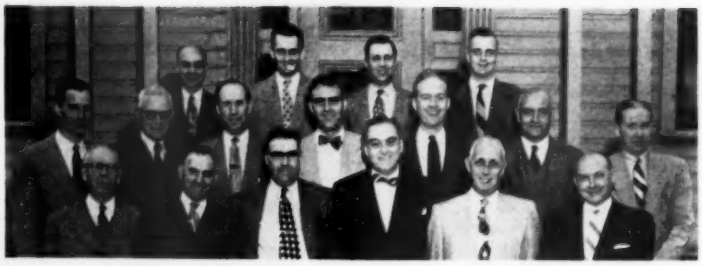
INCORPORATED

20 CONGRESS ST., BEVERLY, MASS.

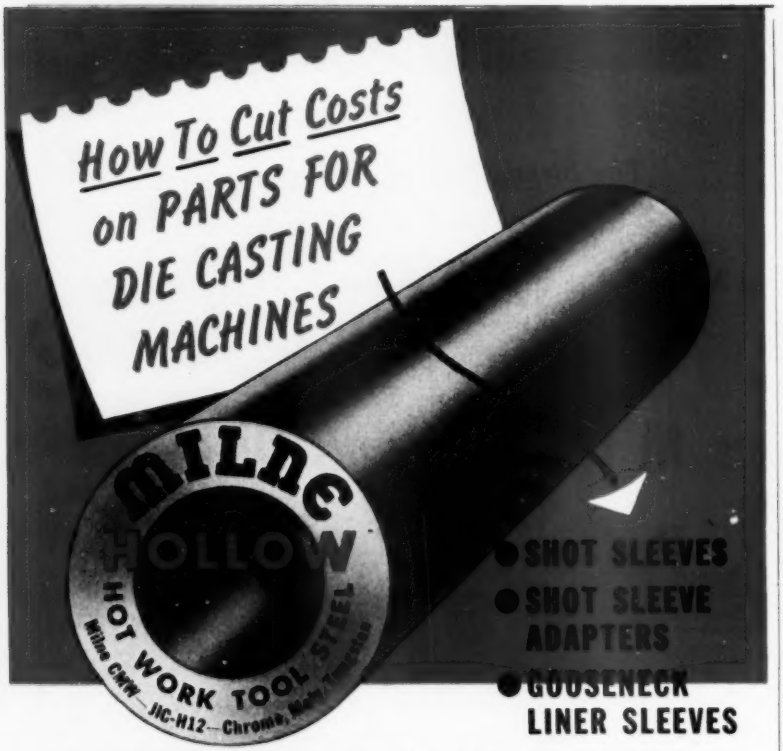
For additional information Circle No. 51 on the Reader Service Card

ACHESON COLLOIDS HOLDS GENERAL SALES MEETING

The Acheson Colloids Company, Division of Acheson Industries, Inc., recently held a general sales meeting at its Port Huron, Mich., home office. The group attending, comprised of branch managers and home office executives, met primarily to hear Alden Crankshaw, Sales Manager, present his policies.



Shown above are: (front row) G. F. Willson, T. Seddinger, E. R. Hayes, W. E. Lang, G. C. Giles, W. Ewart, (middle row) D. H. Lynn, E. A. Lampman, W. F. Sentner, M. L. Bunting, R. W. Montague, A. Crankshaw, M. E. Dougherty, (back row) F. M. Hunter, A. T. Olsson, D. G. Weaver and P. E. Yoder.



- Hollow form minimizes machining. Cuts waste.
- Cost-conscious die casters are using it today.
- High Strength – Tough – High Red Hardness.
- Sizes from 16" O.D. x 12" I.D. to 2" O.D. x 1" I.D.
- Prompt deliveries from warehouse stock.
- Cut to any length.
- Free from decarb... Rough turned O.D., smooth bored I.D. and saw cut faces.
- Every bar furnace annealed... no scale.
- Full length spray painted with permanently identifying color.
- Heat treat card of matching color with each shipment.

Other Milne Tool Steels – both hollow and solid are being successfully used for parts such as trimming dies, cover dies and ejector dies. Also, Graph-Mo® hollow is being used for parts such as hydraulic shot cylinders and hydraulic closing cylinders.

Write today for free literature on Milne's die casting specialty steels. Address request direct to New York Office.

®Trade Mark of the Timken Roller Bearing Co. AM-24

"Visit Milne at Booth 502 — National Metal Exposition - Cleveland - Oct. 19-23"

For additional information Circle No. 73 on the Reader Service Card

NICKEL SHORTAGE STRESSED

The critical shortage of nickel for civilian use and the inequitable distribution and allotment of the small supplies available are causing "extreme hardship, economic loss, sharp decreases in employment and in many cases have forced, or are presently threatening to force, plating companies out of business entirely."

This warning highlighted the annual report of Raymond M. Shock, executive secretary of the National Association of Metal Finishers, Inc., at its annual meeting held recently. The Association represents companies engaged solely in the plating business.

The information as to the plight of the industry came from a nationwide survey of members and non members. In the electroplating industry, third largest user of nickel in the U. S., nickel has been in short supply since 1950.

"Nickel has been the biggest problem for most of our members for the past year", Mr. Shock reported.

NEW DISTRIBUTORS NAMED

The E. A. Kinsey Co., Inc., 16 Washington St., Dayton, Ohio; James H. Cross Co., 2765 W. 8th St., Erie, Pennsylvania; and Harris Pump & Supply Co., Brady and Sidney Streets, Pittsburgh, Pennsylvania, are among the new stocking distributors recently named by Scully-Jones and Company, Chicago, Ill.

PROMOTIONS and APPOINTMENTS

Election of several new officers has been announced by *International Minerals & Metals Corp.*, of New York. KURT WEINBERG is the new senior vice president, H. FRED BAERWALD vice president and assistant to the president, THEODORE GRUEN vice president and JAMES W. GREEN comptroller.

WILLIAM KNUST, advertising manager of *National Lead Co.* since 1927, is retiring on July 1st, after 44 years service. He is succeeded by T. HOWARD SARINE formerly assistant advertising manager. EDWARD A. OLSON was named the new assistant advertising manager.

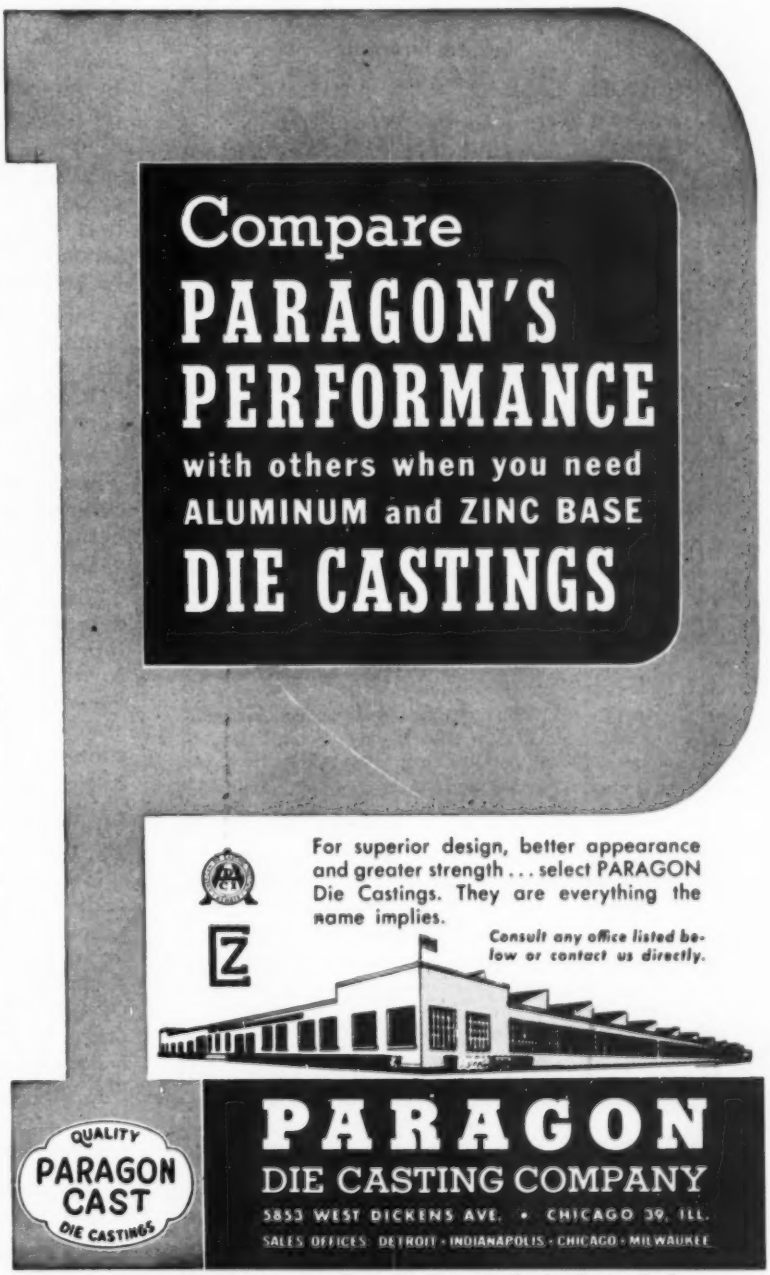
Three personel changes have been announced by the *Stanley Works, Hardware Div.* STEWART R. CARROLL has been named plant superintendant; RUSSELL J. WILLOUGHBY, assistant plant superintendant; and EDWARD T. CLARK, manufacturing superintendant.

CARL C. McKELVY, vice president and factory manager of *Royal Typewriter Co.* has announced the appointments of DAVID B. WOERMBKE, as chief process engineer; D. LEE MACFEIGGAN, as chief standards engineer and HENRY L. OBEDZINSKI as supervisor of the portable assembly department. All men are located in the Hartford, Conn. plant.

Two new representatives have been added to the staff of *Allied Research Sales Corp.*, Baltimore, Md. W. O. OSBORNE has been assigned to the Cleveland and northeastern Ohio western Pennsylvania territory. EARL H. MESSMORE will cover northern Indiana and northwest Ohio from Indianapolis, Ind.

The Metal Finishing Div., *Frederic B. Stevens, Inc.*, Detroit, Mich. will be represented in southern Michigan by ROBERT H. HOFF. For the foundry products division in the eastern Michigan and northern Ohio territory JACK B. BISANZ will be the company representative.

S. E. FLENNER, sales manager for *Alloy Precision Castings Co.*, Cleveland Ohio announces the appointment of EDWIN S. HANNY as representative in Connecticut and western Mass


Compare
PARAGON'S
PERFORMANCE
with others when you need
ALUMINUM and ZINC BASE
DIE CASTINGS
For superior design, better appearance and greater strength . . . select PARAGON Die Castings. They are everything the name implies.
Consult any office listed below or contact us directly.
QUALITY
PARAGON
CAST
DIE CASTINGS
PARAGON
DIE CASTING COMPANY
5853 WEST DICKENS AVE. • CHICAGO 39, ILL.
SALES OFFICES: DETROIT • INDIANAPOLIS • CHICAGO • MILWAUKEE
For additional information Circle No. 74 on the Reader Service Card

NOW! YOU CAN GET IMMEDIATE DELIVERY

on The FINEST EJECTOR PINS Made!

DME HOTFORM and NITRALLOY EJECTOR PINS

CHECK THESE FEATURES!

HOT-FORGED HEAD for Added Strength

NITRIDED CASE for Longer Wear

ANNEALED HEAD that CAN BE DRILLED

TOUGH CORE to Prevent Breakage

CHOICE of HOTFORM or NITRALLOY STEEL

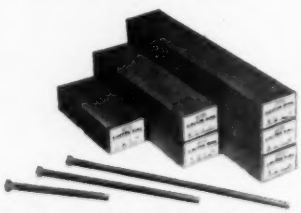
PRECISION GROUND to Close Tolerances

Std. Sizes from 3/32" Dia. to 3/4" Dia.

Standard 6", 10" and 14" Lengths

ALL SIZES IN STOCK at YOUR D-M-E BRANCH

Stock Up and Save!



Consult your D-M-E Catalog for Data and Prices, . . . OR WRITE TODAY for DATA SHEET 521.

Contact Your Nearest Branch FOR FASTER DELIVERIES!

DME **DETROIT MOLD ENG. CO.**

6686 E. McNICHOLS ROAD — DETROIT 12, MICH.

HILLSIDE, N. J.	1217 CENTRAL AVE.	ELIZABETH 3-5848
CHICAGO 44, ILL.	5315 W. LAKE STREET	COLUMBUS 1-7855
CLEVELAND 14, OHIO	5473 LAKE CT.	ENDICOTT 1-0807
LOS ANGELES 7, CAL.	3700 SOUTH MAIN ST.	ADAMS 3-8214

For additional information Circle No. 67 on the Reader Service Card

continued from page 50

art-Warner Corp.; F. P. Strieter, The Dow Chemical Co.; M. F. Tenenbaum, Monarch Aluminum Mfg. Co.; A. E. Weiss, Superior Die Casting Co.; and Paul Winslow, Harvill Corp.

Current research projects

The limiting factor in the die casting process has been the material available for dies. Short die life has been the principal deterrent to the extensive use of the die casting process for casting brasses and other high melting alloys.

When exposed to rapid heating and cooling cycle at brass casting temperatures, steel dies heat check quickly. The high cost of skilled labor which goes into building dies must then be amortized over relatively few castings.

First problem, therefore, has been to determine the basic mechanism of heat checking, since there has never been general scientific agreement concerning the nature of this phenomenon.

Heat checked portions of failed zinc, aluminum and brass die casting dies and failed cylinders and plungers from aluminum, magnesium and brass die casting machines were obtained from participating members.

These samples have been studied, and all data about them such as heat treatment, die lubrication, number of cycles, etc., have been correlated. Also, heat checking has been induced in the laboratory by setting up accelerated cycles under controlled conditions to simulate actual die casting operation.

The basic thinking behind this project, and preliminary steps to date, are presented in an accompanying progress report.

Battelle's die material study pointed up the wide variation in lubricants and lubrication practices in the industry and raised questions as to the effect of lubricants on oxidation. A study of the field was proposed by Prof. Gregg, and while this project is too recent in origin to permit a progress report at this time, a statement of the problem is presented in an accompanying report.

Correlation of high temperature studies

During midsummer 1952, a committee from the Foundation met with executive members of the Research and Development Board, top government research agency, to seek guidance

in the search for technical data relating to high temperature resistant materials.

These government representatives recognized the nature of the problem and the economic importance of the die casting process based upon its high productivity rate and low labor per unit inherent in the process. It was also pointed out that the problem of high temperature resistant materials represents the most difficult of all metallurgical and materials problems in this field.

Members of the RDB concluded that the problem is of sufficient national interest to justify their attention. The Minerals and Metals Advisory Board of the National Academy of Sciences was accordingly asked to correlate this problem in high temperature studies now under way.

Continuing action of the Foundation

With two projects well under way, and government cooperation obtained, the Die Casting Research Foundation will meet again on September 17 in Chicago. At that time, a detailed review of operations will be submitted to members for consideration.

LOW MELTING DIE CASTINGS
continued from page 59

ature levels: 20C and 100C. Also shown are melting and pouring temperatures which are often of interest to the designer.

All of the alloys that are die cast can be plated successfully and, when it is necessary to salvage precious metal plating, will strip quite simply.

In addition to the range of alloys shown in Table 1, there is a range of lead-antimony alloys which have found extensive uses in die cast form. Antimony content of these is commonly from 1 to 13 percent. Antimony adds hardness to the lead alloy, while the presence of tin improves its fluidity.

In the range of three to four percent antimony, battery components are die cast. These include straps, connectors and cable ends. At the other end of the range, 13 percent antimony alloy is used for cigarette lighter bases.

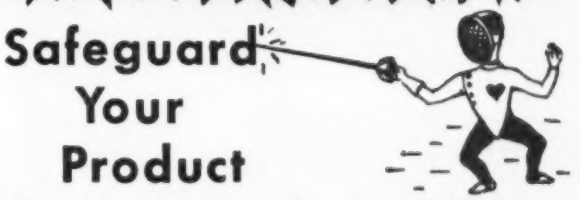
A tabulation of these lead-antimony alloys is given in Table 2.

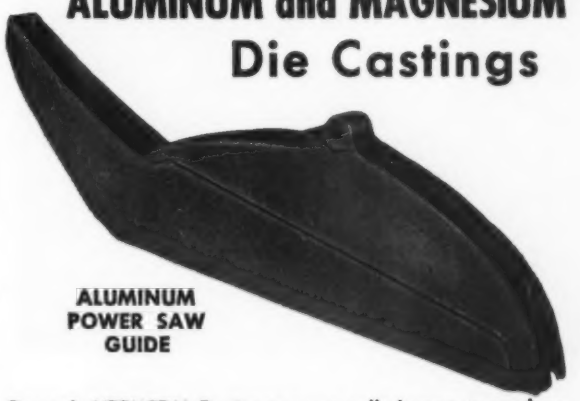
Without going too greatly into detail, the following comments about typical uses of the low melting alloys will indicate the various features obtained:

continued next page

En Garde!

Safeguard Your Product From Cost Competition — Specify ALUMINUM and MAGNESIUM Die Castings





ALUMINUM POWER SAW GUIDE

Recently LITEMETAL Engineers were called upon to produce the aluminum Saw Guard illustrated here. They developed the dies for casting this important protector of users' fingers for Sears Roebuck's new Craftsman 10" Power Saw. Besides the Guard, 5 other aluminum parts are die cast by Litemetal for this tool, which is manufactured for Sears by the Central Specialties Division of King-Seeley Corp. An aluminum die casting such as this Saw Guard is low in cost, light in weight, yet tough and durable. It not only helps reduce the product's weight but virtually eliminates machining, finishing and assembling . . . effecting savings in time and labor that play an important part in holding down the selling price of the finished product. Another advantage is the greater freedom and scope offered designers by the new lightweight aluminum and magnesium alloys.

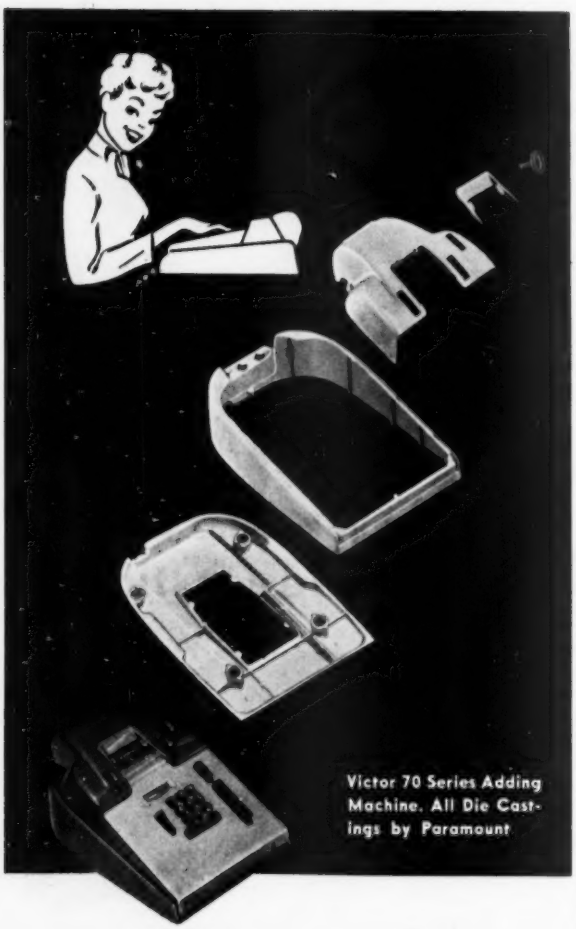
Let's Talk It Over . . .

LITEMETAL DICAST, INC. is an organization of specialists — men thoroughly experienced in the casting and machining of magnesium and aluminum alloys. Our equipment includes big machines for big jobs — little machines for little jobs . . . the right sizes and types of the most modern die casting equipment for producing parts from the size of a button to large cable spools. Complete facilities for secondary operations are also available.

Write today for literature and design information. Quick action on inquiries.

LITEMETAL DICAST, Inc.
A DIVISION OF HAYES INDUSTRIES
1925 WILDWOOD AVE · JACKSON, MICHIGAN
PLANT AND EXECUTIVE OFFICES

For additional information Circle No. 72 on the Reader Service Card



PARAMOUNT
ALUMINUM DIE CASTINGS IN BUSINESS MACHINES

Sales appeal of this Victor Adding Machine was enhanced by the wise choice of Aluminum Die Castings. Its functional design combined with beauty required castings that were strong, yet light in weight; castings that would mate accurately; castings with a surface finish that would satisfy the critical observer's eye. Paramount offers you complete engineering, die making and die casting facilities. We invite your inquiry. *Descriptive literature available.*

ALUMINUM AND ZINC DIE CASTINGS

PARAMOUNT
DIE CASTING COMPANY
ST. JOSEPH I, MICHIGAN

For additional information Circle No. 75 on the Reader Service Card

Fire extinguisher parts: Extreme corrosion resistance in parts having very complex shapes. Unusual coring and irregular contours are often required. High lead alloys, with tin, antimony and copper, are used. Even so, it is often necessary to tin coat them.

Weights for scales: Where parts need high density, and accurately controlled weight per volume, it is sometimes desirable to use lead base die castings. Weights for scales, counterbalances and similar uses are common. These include also flywheel weights and dead weight gages.

TABLE 2

PHYSICAL PROPERTIES OF THE CAST ANTIMONY-LEAD ALLOYS

Sb %	Liquidus °F	Brinell Hardness No.	Density	Tensile Strength psi	Elong. %
0	621	4.0	11.35	1780	80
1	612	7.0	11.26	3400	16
2	602	8.0	11.18	4200	16
3	590	9.1	11.10	4700	15
4	578	10.1	11.03	5660	22
5	565	11.0	10.95	6360	29
6	552	11.8	10.88	6840	24
7	539	12.5	10.81	7180	21
8	527	13.3	10.74	7420	19
9	515	14.0	10.66	7580	17
10	505	14.6	10.59	7670	15
11	496	14.8	10.52	7620	13
12	489	15.0	10.45	7480	12
12.5	485	15.1	10.42	7380	11
13	492	15.2	10.38	7280	10

Motor bearings: There are a number of instances where a part must serve as a bearing and also have exceptional corrosion resistance, as in pump parts in the chemical or process industries. High tin alloy die castings are useful for this. All of the alloys in Table 1 are noted as bearing metals.

Rayon machinery: Its chemical inertness makes lead die castings useful in machinery for rayon, nitroglycerine, and similar process equipment.

Milking machines: In the special machinery used by the dairy industry and other food processing equipment, high tin alloys are useful. They are resistant to attack by food chemicals. This is true also in the design of soda fountain equipment where many tin base die castings are used.

Duplicating machines: For such specialized pieces as the ink retainers on duplicating machines, glue holders on sealing machines and water pots on adhesive tape dispensers, chemically inert lead die castings are widely used.

Cable fittings: Moisture seals for the ends of cables are being die cast in lead alloy. These uses are comparable to battery fitting castings.

X-ray equipment: Where the exceptional density of the lead is needed, as in complex shaped housings for X-ray equipment, lead base die castings are in use.

Voting machines: Some manufacturers of voting machines have found that small pinions die cast in tin alloy resist the extremes of temperature to which their equipment is exposed, with minimum dimensional change.

Roofing nails: Lead-headed nails for roofing are another important use for low melting alloy die castings.

Toys: In making toys, two special uses have been found for lead base die castings — flywheels for inertia motors, and counterweights for dolls' eyes. In each of these, the high weight per volume is the feature.

These are but a few of the multitude of special application that might be mentioned. Some of these are illustrated here by photos of pieces produced by National Lead Company's die casting plant in Perth Amboy, N. J.

HOBBING

Hobbing High Alloy Steels For Aluminum

DIE CASTING

OUR

SPECIALTY

GEARS, DEEP CAVITIES
INTRICATE SHAPES
also
ENGRAVING and
PANTOGRAPHED CAVITIES

Send Us Your Prints For Estimate

The PALFY DIE & MOLD Co.

2900 BRADWELL AVE., CLEVELAND 9, OHIO

TELEPHONE SHADYSIDE 1-8450

For additional information Circle No. 99 on the Reader Service Card

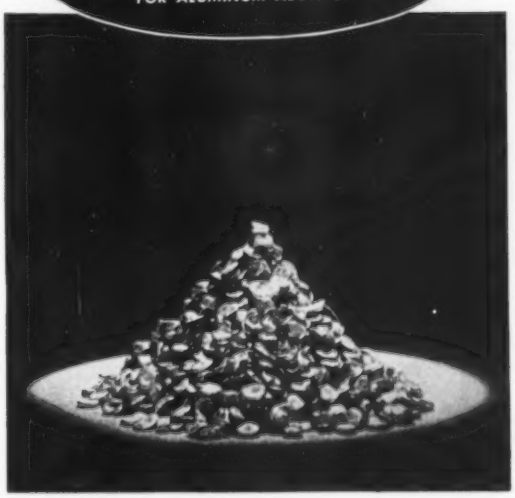
Zamak * Users!

do you make your own alloys?

if so, USE . . .

* Z-shot

FOR ALUMINUM ADDITION



- no magnesium addition
- uniform pellets
- low melting point
- no dross

write for information

The GEORGE SALL METALS CO., Inc.

Producers of High Grade Aluminum Alloys & Zinc Alloys

2300 East Butler Street
PHILADELPHIA 37, PENNSYLVANIA

For additional information Circle No. 76 on the Reader Service Card

Promotions & Appointments
continued from page 99

Two new field engineers have been appointed by *The Bellows Co.*, Akron, Ohio. W. W. SMITH with headquarters in Cleveland, Ohio and DAVID J. TREPANIER with headquarters in Akron, Ohio.

HENRY KASHMAN is the new sales engineer for the *G. S. Blakeslee & Co.* His headquarters will be in New York, N. Y. In the southern Ohio, West Virginia, Kentucky territory the company will be represented by WILBUR THIESS.

The appointment of WILBUR C. JONES as advertising manager of *The Hoover Co.*, Canton, Ohio has been announced.

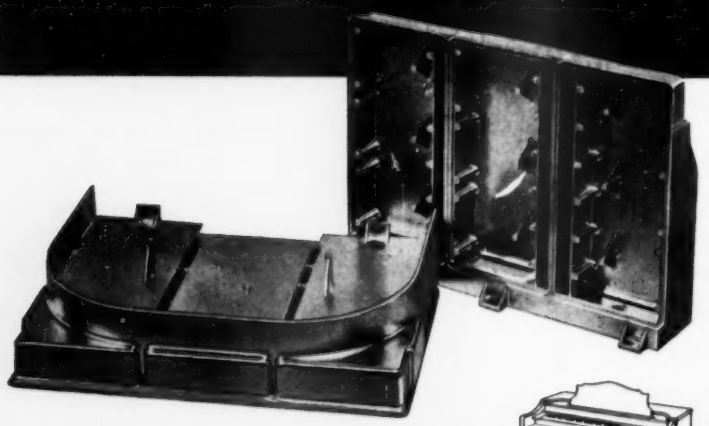
Appointment of A. A. THROCKMORTON as alloys division manager in charge of sales for primary pig, ingot and billet products and special foundry ingot is announced by *Kaiser Aluminum & Chemical Sales, Inc.*

Minnesota Mining & Mfg. Co. has appointed the METALS FINISHING CORP., Hazel Park, Mich. as its distributor for the "Honite" line of barrel finishing products. HARVEY BEGGS, is president of the Metals Finishing Corp.

Servel, Inc., Evansville, Ind. announces four promotions in the purchasing department. JAMES E. YOUNG and JOHN A. EVANS were promoted to purchasing agents. WILLIAM K. JOHNSON is the new subcontracts manager and FRANK A. KALKBRENNER is supervisor of purchasing services.

Five changes in the management organization of *Oakite Products, Inc.*, New York, N. Y. have been announced. H. LIGGETT GRAY is now vice president; FRANK L. OLDROYD is vice president and general sales manager; EUSTACE LINGLE and VAN DORN C. SMITH have been elected vice presidents and GEORGE M. SEIB is the new assistant manager to the office of the secretary.

ACCURATE Magnesium Die Castings . . . a new note in WURLITZER ORGAN quality



Large two piece magnesium die cast reed holder produced for the Wurlitzer Co.

The change from a heavier metal casting to ACCURATE magnesium die castings reduced weight and production costs for the Wurlitzer Co. Priced competitively with heavier metal castings, these matched magnesium die castings were lighter to handle, machine, and assemble . . . are shock-resistant . . . non-rusting and dimensionally stable. ACCURATE die casting engineers would welcome the opportunity to work with you in adapting magnesium die casting to your product. Write today for recommendations and cost estimates.

Here are a few additional advantages combined in each ACCURATE Magnesium Die Casting:

- Light Weight
- High Strength
- Low Cost
- Fine Surfaces
- Close Tolerance
- Uniformity
- Laboratory Controlled Quality

Major Producer of Aluminum, Zinc and Magnesium Die Castings

ACCURATE DIE CASTING CO.

3089 E. 80th STREET • CLEVELAND 4, OHIO

For additional information Circle No. 62 on the Reader Service Card

CORRECTION

In the caption for a photograph showing executives of the Dollin Corp. and builders present at the ground breaking for Dollin's new plant facilities at Irvington, N. J., one name was accidentally omitted. Presented here are the names of individuals in the photograph: (Left to right) Mr. Stillman of D. H. Hair Assoc., architects; Lewis Turner, vice president and general manager, Dollin Corp.; D. H. Hair of D. H. Hair Assoc.; E. N. Dollin, president, Dollin Corp.; and Mr. Bickle, president, Brown & Matthews, builders.

LETTERS TO THE EDITOR
continued from page 14

back copies of PMM that are still available. Some of them have had design data, information on specifications, physical properties, typical applications, and such material for use in designing and purchasing. We have also sent our annual directory of the powder metallurgy industry, published each April in conjunction with the annual meeting of the Metal Powder Association. — Ed.

COLOR BUFFING EQUIPMENT

Please send to my attention, information on and manufacturers of equipment for color buffing of aluminum and steel. — R. H. W. (Executive Vice President.)

A list of suppliers of various types of buffing machines, buffs, compound and auxiliary equipment has been forwarded. —Ed.

LOST WAX OR SHELL MOLDING

We are interested in solving some production problems by use of investment castings, either lost wax or shell moulding or both. Will you please furnish a list of those who are producers of such castings near our plants in Indiana and New Jersey.

We have several requirements, one of which is for castings up to 30" in diameter and weights up to 200 lbs.

Would you also recommend a good technical book for complete information on these processes. — R. R. (Superintendent).

One of the limitation on conventional lost wax investment casting has been that of size. Although, the Mercast process which uses frozen mercury for the expendable pattern is capable of producing very large

continued on page 108

For additional information Circle No. 89 on the Reader Service Card

Powdered Iron Eccentric Flange Bushing Increased Operating Life Of Textile Machinery

Outstanding physical characteristics and the inherent resistances to wear, heat and shock of the IPM powdered metal flange bushing reduced down time, lowered maintenance costs and increased production.

The powdered metal bushing, which outperformed previously machined parts, features an eccentric hole molded to very close tolerances to permit as-molded assembly. In addition to eliminating machining operations, scrap loss and unit cost were reduced.

Here may be the economical answer to your specific component requirements. We would welcome the opportunity to show you how you can benefit from the many advantages of IPM powdered metal parts. Write or phone today.

Fact-filled engineers handbook is now available to design engineers. Write request on company letterhead.

International Powder Metallurgy Co.
439 W. MAIN STREET • RIDGWAY, PENNSYLVANIA

Our modern plant, with 40,000 square feet of modern facilities and complete design and engineering services, assures you the ultimate in die casting quality for every product need.

NEW ENGLAND DIE-CASTING CO.
West Haven Connecticut

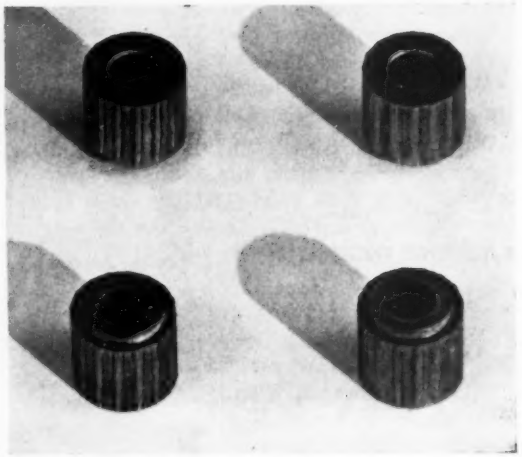
For additional information Circle No. 92 on the Reader Service Card

SIMPLIFIED SOLUTIONS

for production problems

AN INSERT FOR MOLDED PLASTIC PIECE, shown at the right, was formerly produced on an automatic screw machine with secondary operations. It was turned from bar stock and then required diamond knurling on the outside surfaces and reaming the central hole with a diamond drill. Tolerance requirements on the center hole are especially close, being specified at .0005.

Seeking to find a more economical method of producing the part which is used in considerable quantities, the manufacturer investigated and subsequently tried the powder metallurgy process. It is now being produced successfully by American Sinterings Division of American Tool Works by that process. It is pressed from iron powder at 40 tsi, sintered 45 minutes at 2050 F, and then coined at 40 tsi. In place of the diamond knurling, the piece now has longitudinal ridges which anchor the insert into the plastic. Final density as sintered and coined is 88 to 90 percent of theoretical.

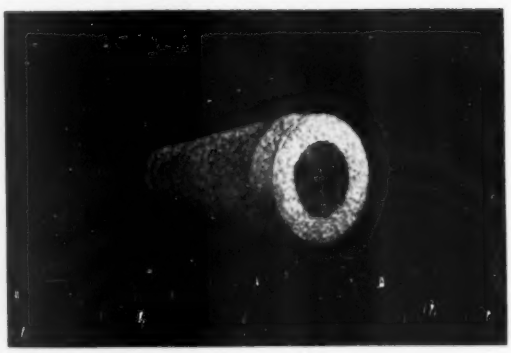


FILTERS made from powdered metals are not new, but one of the more unusual uses for these filters is the removal of solid matter larger than two or three microns from oxygen at 2000 psi line pressure. The conical filter, right, is made of bronze powder.

Shape is an important element in the design of these filters. By utilizing a cone instead of a flat plate, the effective filtering area is greatly increased without having to increase the size of the housing materially.

Since the filters have a porosity of about 50 percent, fastening is a problem. Even moderate pressures tend to collapse the structure so that the cone is not firmly held. By using a rather soft compression member adequately tight assemblies are secured.

In addition to acting as a filtering media, these bronze filters are effective as flow controls. By maintaining a constant pressure drop across the filter, the amount of gas passed can be metered accurately by the area of filter exposed. A plate with a hole in it so that the tip of the filter can be accomplished by changing the hole size to allow more or less of the filter tip to protrude.

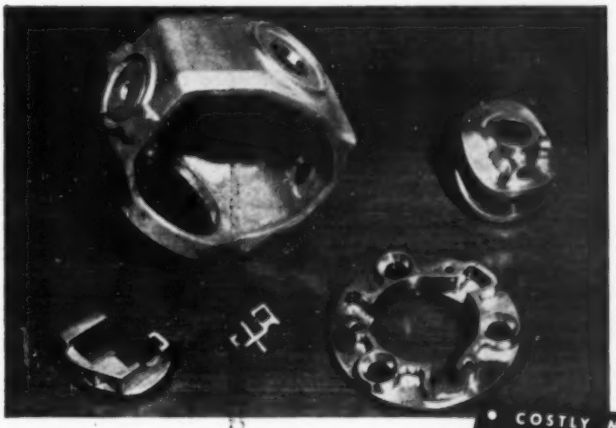


BRITISH FIRM BUYS CONTROLLING INTEREST IN SCHULTZ OF CANADA

Controlling interest in two Canadian companies has been bought by Ackton Hall Colliery Co., Ltd. of England, it has been announced. The two firms are Schultz Die Casting Company of Canada, Ltd., producers of die castings, and Sydenham Trading Co., Ltd., Electro-Plating Div.

D. A. McIntosh of the legal firm, Fraser, Beatty, McIntosh and Stewart in Toronto, becomes president of both companies. E. W. Sanger, well known in the British die casting industry, has been appointed vice president and managing director of Schultz Die Casting Co. of Canada, and a director of Sydenham.

The prevailing close association with the Schultz Die Casting Co. of Toledo, Ohio, in regard to exchange of technical information and development, will be maintained.



Scale ½"=1½ App.

• COSTLY MACHINING OPERATIONS WERE COMPLETELY ELIMINATED BY CASTING THESE PARTS BY THE "LOST WAX PROCESS"

Machined? or Cast?

PRECISION INVESTMENT CASTINGS

- cast centrifugally
- models and molds made by us
- non-ferrous only
- sample delivery three weeks from receipt of order

Send blueprints or samples to Home Office for prompt quotations.

Z+H

Z & H MFG. CORP.

31 Welcher Avenue • Peekskill, New York

NEW *information on the*

Refractory Hard Metals

in the new book by *Paul Schwarzkopf* and *Richard Kieffer* provides

- **New BASIC knowledge** on the preparation and properties of the compounds of carbon, nitrogen, boron, and silicon with the transition metals of the 4th to the 6th group in the periodic system. Much of this information has only recently become known and is published here for the first time.
- **Important HIGH TEMPERATURE data** A critical evaluation and comparison is given of the performance in high temperature applications of the metal-bonded products, new super alloys and recent developments in ceramics.

This book can be vitally important to you in solving today's materials problems.

SEND FOR A FREE TRIAL COPY

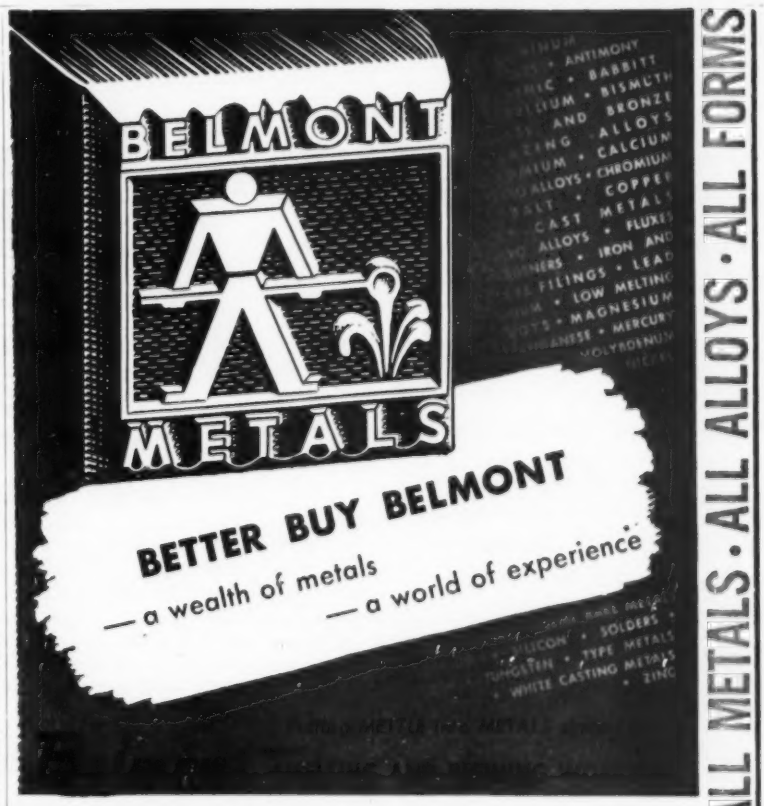
The Macmillan Co., 60 Fifth Ave., New York 11

Please send me a copy of Refractory Hard Metals at $10.00. I will either remit the full price plus small delivery charge, or return the book in 10 days. (Save: enclose check or money order and we pay delivery charge.)

Signed .....

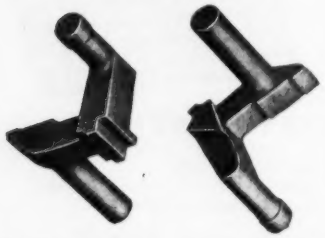
Address .....

This offer good only within continental limits of U.S.A.



307 Belmont Avenue, Brooklyn 7, N. Y. Dickens 2-4900

Forgings Replaced WITH EpCo INVESTMENT CASTINGS



Castings pass 100% X-ray inspection. Material: Alloy Steel AISI 8620

THE ILLUSTRATION SHOWS A PAIR OF LEVERS USED IN A HIGH-SPEED GUN BREECH MECHANISM

THESE PARTS WERE PREVIOUSLY MACHINED FROM SAE 1020 FORGINGS. A CONSIDERABLE SAVING IN COST WAS REALIZED BY USING AN EPCO INVESTMENT CASTING

SEND US YOUR DRAWINGS FOR QUOTATION ON PARTS WHERE ***EXTRA QUALITY*** MUST BE MAINTAINED

EpCo ENGINEERED PRECISION CASTING CO.

FREEHOLD ROAD MATAWAN, N. J.

Circle No. 86 on the Reader Service Card

LETTERS TO THE EDITOR continued from page 105

castings, about 40 pounds is the largest so far cast by this process. Shell molding is also capable of producing good-sized castings, but not as large as required.

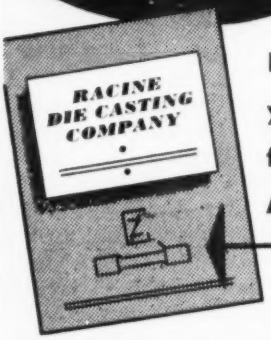
A good book on Investment casting is 'Investment Casting for Engineers' by Wood and Von Ludwig (Reinhold, N. Y.). —Ed.

REJOINS F. B. STEVENS

Roman C. Bender has rejoined the Metal Finishing Equipment and Supplies sales staff of Frederic B. Stevens, Incorporated. He will cover the state of Indiana and operate from the Stevens Indianapolis Branch at 36 Shelby Street.

Circle No. 108 on the Reader Service Card

Looking For A Dependable Die Casting Service?



It's yours for the Asking

Die castings to specifications . . . that's our specialty. You'll get the job done the way you want it when you specify Racine, and you can be sure your tools and dies are fully protected in our special fireproof storage vaults. We invite your inquiries and will welcome an opportunity to serve your die casting requirements.

Send for our new, free brochure.

RACINE DIE CASTING CO.

1500 16th St. • Racine, Wis.

Exact samples in a hurry with MASTERMET *alloys*

When you need to furnish sample investment castings in specified alloys it's time to call Cannon-Muskegon for MasterMet certified alloys. Our small 100-pound test crucible enables us to produce small melts for your samples. Then our larger production furnaces assure you identical, uniformly castable metal for the production run. Another service is help in calibrating the loss characteristics of your remelting furnace, so you can order alloys specifically tailored for loss expectancy. MASTERMET is available in SHOT or INGOT form for best melting in YOUR equipment.

Write Cannon-Muskegon for a brochure covering our facilities or for an actual sample of our product.

CANNON-MUSKEGON

MUSKEGON, MICHIGAN

For additional information Circle No. 84 on the Reader Service Card

INDUSTRY NEWS

YALE & TOWNE BUYS PMP TO EXPAND FACILITIES FOR POWDER METAL PARTS

The Yale & Towne Manufacturing Company, in exchange for 12,000 shares of its stock, has purchased the business and assets of the Powdered Metal Products Corporation of America, of Franklin Park, Ill., it has been announced by Gilbert W. Chapman, Yale & Towne president.

The new acquisition substantially increases Yale & Towne's participation in the powdered metal products industry. Last summer, Yale & Towne purchased the American Sintered Alloys company at Bethel, Conn.; it now has Eastern and Midwestern plants to manufacture and sell powdered metal products.

The Powdered Metal Products Corporation of America was founded in 1943. It operates a one-story, brick plant and laboratory and employs 85 persons.

SPEAKER ANNOUNCED FOR FALL MPA MEETING

Felix Edgar Wormser, Assistant Secretary of the Interior for Mineral Resources, will be the principal speaker at the fall meeting of the Metal Powder Association. Mr. Wormser will speak informally on mineral problems of special interest to the association members.

This meeting, to be held at the Greenbrier, White Sulphur Springs, West Va., is the first of its kind to be held by MPA, will be open to members only. Meeting dates are September 11, 12, and 13.

CERTIFIED ALLOYS EXPANDS ZINC ALLOY FACILITIES

Certified Alloys Co., Bedford, Ohio, a major producer of zinc die casting alloys has completed its expansion program which increased production capacity 40 percent, it has been announced by H. Barnett, president.

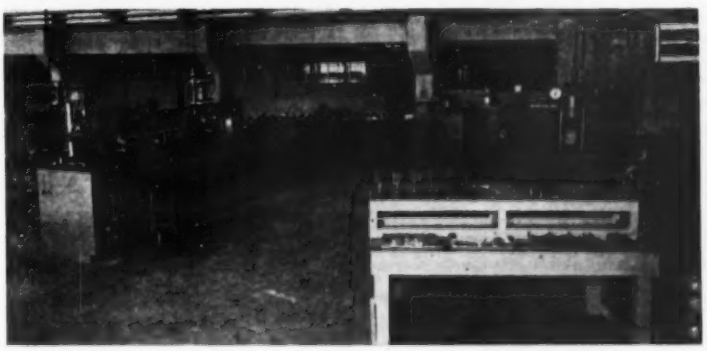
The fireproof one-story addition to the main plant has been equipped with a new 40,000-lb. reverberatory and modern automatic pigging equipment. The furnaces are serviced by automatic pouring ladles and mechanized ingot conveyors. Quality is controlled and checked by modern testing equipment.

ANDERSON CO. PURCHASES INVESTMENT CASTING FACILITY

The W. H. Anderson Co., Inc. has recently purchased the Investment Casting Div. of the Kerr Mfg. Co. of Detroit. "We intend to continue production of investment castings in

continued next page

INVESTMENT CASTING LABORATORY ESTABLISHED

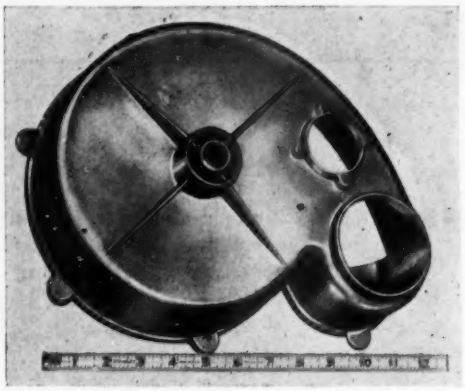


Announcement has been made of the establishment of an investment casting laboratory by the Navy Department at the U. S. Naval Ordnance Test Station at China Lake, California. The new laboratory was planned and installed by Leonard G. Daniels, metallurgist of the Methods Development Branch, Materials Enginering Division, who will direct the laboratory's operation.

The chief purpose of the new facility is to investigate possible improvements in the process and to add to open literature any developments which may aid in a broader technological advancement. Equipment has been installed to produce investment castings in sample and pilot production.

Shown above is the lab along with a display board showing steps in producing an investment casting.

For additional information Circle No. 87 on the Reader Service Card



FEDERAL

ALUMINUM BLOWER HOUSING

New and improved cold chamber casting equipment at FEDERAL now produces larger than average aluminum die castings of superior quality.

FEDERAL built dies and high pressure casting equipment with water hydraulic impact injection assure die castings of GREATER DENSITY and BETTER FINISH!

Aluminum and Zinc Alloys

FEDERAL DIE CASTING CO.

2220 NORTH ELSTON AVE. • CHICAGO 14, ILL.

Phone ARmitage 6-4803

Spincraft

SKILL WILL DO IT

STAINLESS STEEL

Ladles

FOR DIE CASTING

- are lighter in weight
- are easier to pour
- are safer to use
- last MUCH LONGER

For these good reasons—proved conclusively in field service—Spincraft ladles of stainless steel can help increase your production, lower your costs, and build worker good will. It will pay you to investigate this great new ladle that outperforms all others, but asks no premium in price. Write today for an informative bulletin that also illustrates Spincraft's wide range of ladle sizes.

Spincraft

SKILL WILL DO IT

4131 West State Street

Milwaukee 8, Wisconsin

For additional information Circle No. 94 on the Reader Service Card

INDUSTRY NEWS — cont.

a larger volume and with the incorporation of the latest and most advanced techniques that are now available for producing a quality casting to closer tolerances," R. M. Thornburn, manager, manufacturing division said.

To implement this the Anderson Co. has retained Leonard W. Dean as technical consultant. Dean has been associated with the investment casting industry for 15 years in a wide variety of capacities: production, tooling, engineering and sales.

PLAN NICKEL SALES

National Lead Company has announced that it has taken over responsibility for distribution of all production of the Government-owned nickel plant at Nicaro, Cuba.

For this purpose, National Lead has set up a newly

"BLIND DATES" MAY BE ALL RIGHT FOR VISITING FIREMEN,

but you can't afford to risk the quality and reputation of your product on an unknown source of supply:

Jersey Plastic & Die Casting Company has been in the business many years; we're proud of our long list of customers who keep coming back because they like the work we do. We invite you to investigate our plant, look at some of the thousands of different castings we have produced, and give us a chance to quote on your castings. Our engineers will gladly advise you on any technical problems you may have with your die casting designs.

It will pay you to look into this dependable source of die castings. Write for our free booklet.

JERSEY PLASTIC & DIE CASTING CO.

148 Shaw Avenue, Irvington 11, New Jersey

Circle No. 104 on the Reader Service Card

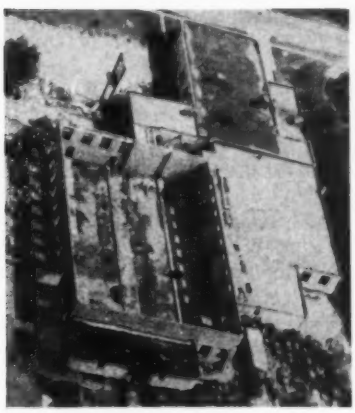
formed Nickel Sales Division to render technical service and assistance to nickel users.

Headquarters of this Division will be located at 111 Broadway, New York 6, New York.

DU-WEL BUILDS NEW DIE CASTING PLANT; EXPAND TOOL SHOP

Du-Wel Metal Products of Bangor, Mich., has moved its die casting foundry into a newly constructed building and has expanded its tool room and machine shop facilities into the building space formerly occupied by the die casting plant.

The new two-story concrete and cement block plant on a 120 x 80 ft. foundation, adjoins

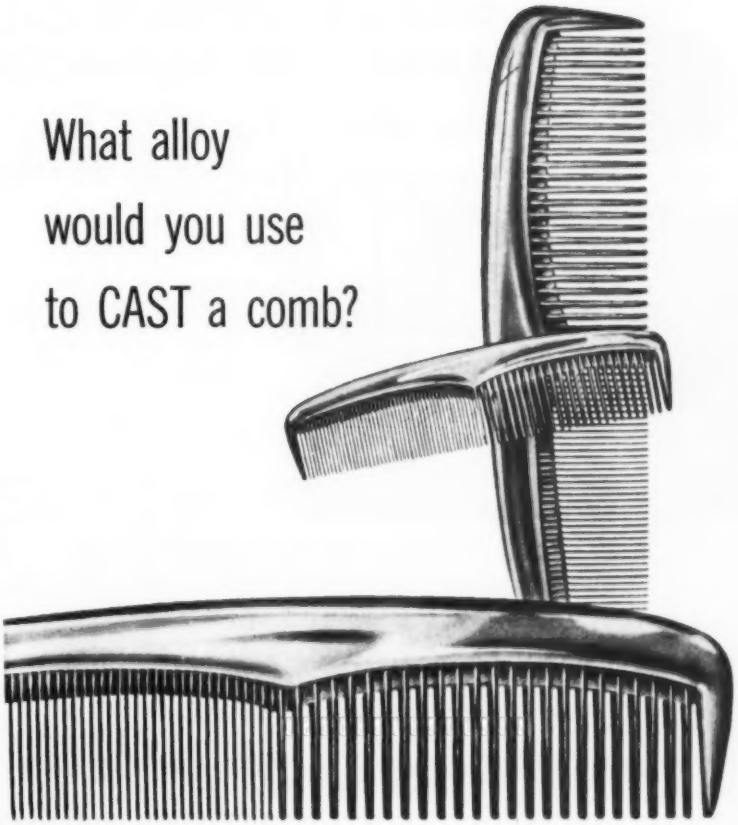


AERIAL VIEW shows new Du-Wel plant before roof was installed over new section. Since photo was taken, roofing has been completed and equipment installed. Photo courtesy The Bangor Advance.

the old building and warehouse. Remodeling of new office quarters and expanded tool and machine shop facilities is now under way.

This is the fourth expansion program undertaken by Du-Wel since it was located in Bangor seven years ago. The company began in a building having 5,400 square feet of floor area. The latest addition brings total floor area up to 30,000 square feet.

What alloy would you use to CAST a comb?



Remember, you have plenty of thin walls. You need fluidity . . . and how! You need a high tensile, too, so the comb's user doesn't get a scalp full of teeth.

Probably you'd use a standard 12% silicon-aluminum alloy. You could, but you can do it *better and for less money* with Federated F-4110. Here's why F-4110 is superior for this job, and others:

F-4110 has a higher tensile strength, yield strength, and proportional limit. The tensile, for example, runs 31,000 to 35,000 psi. It has a higher Brinell, too.

The exceptional fluidity of F-4110 makes it ideal for thin-walled, complicated castings. Resistance to hot cracking is high. The tendency to weld to the die is minimum.

An F-4110 casting is easier to machine. Also it has a much whiter finish after polishing.

Remember, too, F-4110 is *lower in price* than the standard aluminum-silicon alloy!

For more information, call or write any one of Federated's 14 plants or 24 sales offices across the nation.

Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY

120 BROADWAY, NEW YORK 5, N. Y.

In Canada: Federated Metals Canada, Ltd., Toronto and Montreal

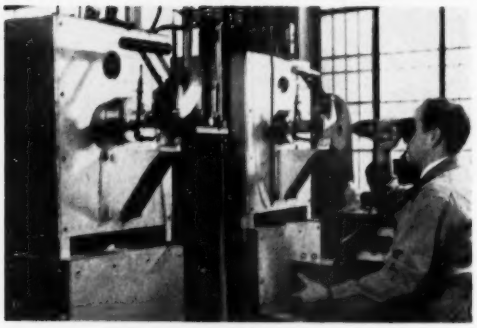
Aluminum and Magnesium, Babbitts, Brass and Bronzes, Anodes, Die Casting Metals, Lead and Lead Products, Solders, Type Metals

For additional information Circle No. 49 on the Reader Service Card

For additional information Circle No. 88 on the Reader Service Card

VERSATILE - ECONOMICAL HARPER TUBE FURNACES

Sinter Alloy - Tips for Phonograph Needles *at Permo*



Harper GT-20-HM-30 Tubular Element Furnaces in operation at Permo, Inc. Chicago, Illinois. Max. Temp. 3000°F.

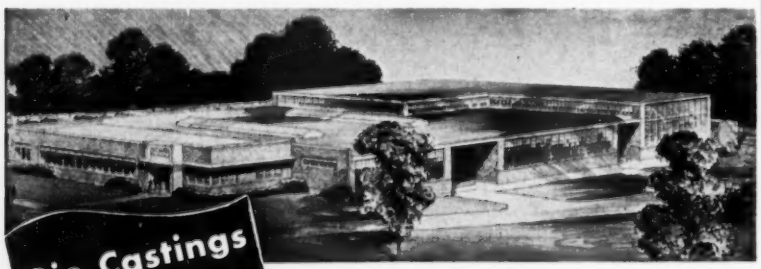
(Photo courtesy of Permo)

The two furnaces shown above are being used extensively for both research and production sintering of various precious metal tip alloys for Permo long-life phonograph needles.

Mr. W. H. Lenz, Metallurgical Director at Permo says: "We have found them very useful, adaptable and economical for this high temperature work. The furnaces are versatile to the extent that they may be operated, if desired, with almost any kind of atmosphere including air."

Let us send you information on versatile Harper Furnaces which will do an accurate and economical job for you. Write for Bulletin 1148.

HARPER ELECTRIC FURNACE CORP. DEPT. 15, 39 RIVER ST.
Buffalo 2, New York



Die Castings by MILWAUKEE

...for Extra Values at No Extra Cost!

A pioneer in its field, Milwaukee offers you the experience and knowledge gained in helping others for more than 40 years, to realize the full benefits of the die casting process. In its modern plant, it offers you the most advanced facilities for the production of zinc and aluminum die castings. These extra values which cost you no more, can help you build extra values into your product, too.

We operate under the Certified Zinc Plan of the American Die Casting Institute, Inc.

MILWAUKEE DIE CASTING COMPANY
4146 N. HOLTON STREET • MILWAUKEE 12, WISCONSIN
Established 1909

For additional information Circle No. 90 on the Reader Service Card A 7548-½

H-P-M- APPOINTS EUROPEAN REPRESENTATIVE

The Hydraulic Press Mfg. Co. has announced the appointment of W. M. Truska, Jr. as European sales representative for its new manufacturing center in the Netherlands, Hydraulische Pers Maatschappij, Nederland, N. V.

As a wholly-owned company subsidiary, Hydraulische Pers

W. M. Truska

Maatschappij will co-ordinate sales, services and manufacturing facilities. Headquarters for the company will be in Amsterdam. Actual manufacturing will be done by GEBR Stork & Co. N. V., Hengelo, Netherlands. New officers of the corporation are: G. B. Robinson, chairman of the board; John C. Conter, president; John M. Dolan, vice president; and George A. Daniels, secretary-treasurer.

PRESSCO CASTING APPOINTS CHIEF ENGINEER

W. P. Hodgkins, president of Pressco Casting and Mfg. Co., Chesterton, Ind., has announced the appointment of W. J. Brinkman as chief engineer. Formerly chief engineer of Aluminum Industries of Cincinnati, Brinkman is well known in the non-ferrous foundry field.

Other changes at Pressco are that the sales department will be under the personal direction of W. P. Hodgkins; S. E. Greg-

ory formerly sales manager is now in charge of a specific territory; and H. M. Harrison will be sales assistant under Hodgkins.

AMERICAN SINTERINGS MAKES POWDERED METAL PARTS; DIV. OF AMERICAN TOOL

American Tool Works of Hartford, Conn. has recently formed the American Sinterings Div. to manufacture all types of parts from metal powders.

The new division is under the management of Alexander Alves, well known engineer and powder metallurgist. Set-up of the company is such that an entire job can be done if necessary. Starting with design and furnishing a fully finished product on which any necessary machining, after fabrication from powders, has been done.

For additional information Circle No. 109 on the Reader Service Card

CONGRATULATIONS TO THE

American Die Casting Institute

ON ITS

SILVER ANNIVERSARY

ROTH SMELTING COMPANY
ALUMINUM INGOTS • ZINC ALLOYS
BOX 88, THOMPSON ROAD, SYRACUSE, N. Y.

IMS CONCENTRATED

SILICONE BOMB MOLD LUBE

The Best Mold Release You Can Buy! Forms a "Slick Quick"!

UNDILUTED
ODORLESS
NON-TOXIC
SAFE

Dry Freon Propellent Protects Your Molds

PRICES:
Sample Can ... $ 2.00
Unbroken Dozen $18.00
(at $1.50 each)
Unbroken Gross $197.40
(at $1.37 each)
Further discounts on larger orders

INJECTION MOLDERS SUPPLY CO.
3514 LEE ROAD WYoming 1-1424 CLEVELAND 20, OHIO

For additional information Circle No. 98 on the Reader Service Card

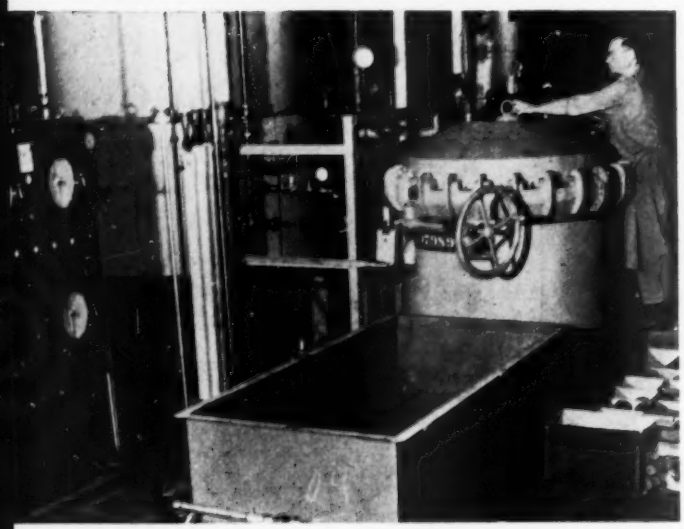
PEERLESS
STANDARDIZED PINIONS and RACKS
FOR
DIE CASTING MOLDS
PERMANENT MOLDS
PLASTIC MOLDS

Standard sizes of Peerless "Flame Hardened" Ejector Racks and Pinions are available for prompt shipment. Special sizes may be produced to your specifications.

We welcome your inquiries.

Peerless Gear & Machine Co.
320 N. WESTWOOD AVENUE
P.O. Box 317, Station "C"
TOLEDO 7, OHIO
Established 1921

For additional information Circle No. 100 on the Reader Service Card



FULLY AUTOMATIC 1500 gallon autoclave is used to make Pratt & Whitney Aircraft's aluminum and magnesium castings leakproof through vacuum-pressure impregnation of diallyl-phthalate-base polyesters. Prior to impregnation, castings are cleaned in the tank in the foreground.

Comparison of IMPREGNANTS for aluminum and magnesium castings

By CARL F. OLSON*

ALUMINUM and magnesium alloy castings intended for use in gas or liquid pressure or vacuum systems show a high percentage of rejects in their rough or machined condition unless corrective measures are taken to eliminate leakage paths. This has proven to be a particularly serious problem with complicated and expensive castings, such as those required for conventional and jet aircraft engines. Therefore, the "leak-proofing", or impregnation, of what otherwise might be extremely expensive rejects is coming to be recognized as a "must" by cost-conscious manufacturers.

Many metal castings, particularly non-ferrous metals such as aluminum and magnesium, which appear by visual inspection and normal metallurgical tests to be sound and non-porous prove, nevertheless, to be "leakers" or "weepers". The best possible foundry techniques often cannot overcome the natural tendency of these metals to solidify with microscopic spaces at the grain boundaries. Then, too, during solidification, infinitesimal bubbles of air or gas often escape from the metal, leaving capillary pathways. These voids and pathways become avenues for the escape of pressure.

Although the process of correcting such porosity by means of impregnation with the proper sealants has been known and used for many years, it

*Chemical Div., General Electric Co.

was not until World War II that impregnation became a widespread practice, due in a great part to development of impregnants far superior to those formerly used. Both Industry and the Military are now accepting the fact that impregnation is **not** a means for mending or passing unsatisfactory castings containing gross porosity, cracks, or blow-

EDITOR'S NOTE: Although written with sand cast aluminum and magnesium in mind, this article is pertinent for the more precise types of castings because of the increasing use of die castings and permanent mold castings for aircraft, hydraulic and other pressure-tight applications.

holes; impregnation should be recommended and used only for the leak-proofing of castings which are structurally sound.

Large users are beginning to impregnate as a rountine production operation. At present, about 75% of all casting sealants are used by or for aircraft manufacturers and subcontractors, mostly military. Practically all castings used in aircraft fuel control systems are impregnated. These fuel systems operate under a normal pressure of from 1400 to 2000 pounds per square inch. Other aircraft applications include castings used with hydraulic systems for brakes, landing gear and flight controls. Blocks for reciprocating engines are impregnated by some manufacturers because the lubrication system of such engines is incorporated as cored passages in the block castings themselves. The general trend in aircraft manufacturing is toward the impregnation of all aluminum and magnesium castings which are subjected in service to high pressure (100 psi or more), in order to give a margin of assurance of tightness.

Other applications for impregnants include aircraft cabin supercharger systems; navigating, communications, and armament equipment and instruments which include hydraulic controls; parts of optical instruments which operate in an atmosphere of nitrogen or other gas; and parts for compressors, pumps, hydraulic fittings, valves and many other miscellaneous parts for pressure service.

Automotive castings impregnated

Also, several large manufacturers of automotive equipment and components are either using or considering the use of impregnants for such parts as cylinder heads, carburetor and fuel pump parts, and power transmission cases.

Impregnating may be done by the manufacturer involved, or by custom impregnators. For manufacturers who wish to set up their own impregnating units, suppliers of impregnants will furnish assistance in design of equipment suitable for use of their product, and assist in getting the process operating efficiently. It is very advisable that every care be taken in selection of the best material for the parts or product involved, however, as once the equipment and process is established for a specific impregnant, a change of material may involve expensive equipment redesign and scrapping of the material formerly used in the tanks. The cost of the impregnant used is often an insignificant factor, due to the small amount of material involved as compared to labor costs.

For low volume work or for trial runs, custom impregnators are available in most industrial areas. Many of these have developed a high degree

continued next page

CHART I

PROPERTIES OF MAJOR TYPES OF SEALANTS

	DAP Polyester	Styrene Polyester	Styrene-Vegetable Oils	Vegetable Oils	Sodium Silicate
RAW MATERIAL					
% Solids	100	100	100	100	100
Volatility	E	F	F	E	E
Flammability	E	P	P	E	E
Toxicity	G	F	F	G	E
Odor	G	P	P	G	E
Storage Life	E	G	G	E	E
Tank Life	E (1)	G	F	F	G
Cleanability with non-flammable solvents	E	G	F	F	E
Handling conditions	E	F	F	F	E
CURED MATERIAL					
Tight Seal	E	E (2)	F	F	F
Permanence	E	E	P	P	P
Temperature Resistance	G	G	F	F	E
Solvent Resistance	E (3)	G (3)	P	P	E
Abrasiveness	E	E	E	E	P
Electrical Properties	E	E	F	F	G

Notes: (1) When aerated and cooled.
(2) Ultimate tightness; may require multiple impregnations.
(3) Attacked by strong alkalies.

E—**Excellent** in this respect.
G—**Good** in this respect.
F—**Fair** in this respect.
P—**Poor** in this respect.

of technical competence. Although responsible custom impregnators will not guarantee 100% satisfactory sealing, proper choice of impregnant results in very high efficiency of sealing.

Impregnation is usually carried out after machining of the castings, as the rough castings may have blind capillaries or voids which would remain unfilled by the sealing compound, but which may be opened up by machining. This would result in leakage through the machined casting, regardless of the care with which the rough casting was impregnated. Successful leak-proofing of castings which have undergone expensive machining operations often results in large savings in time and money. Sealants are, therefore, often specified by engineers concerned with finishing, assembling, testing, or with the performance of the parts in service.

Castings are usually impregnated by means of a vacuum-pressure cycle to insure maximum filling of the voids with the sealing material. Military Specification MIL-I-7878, "Impregnation of Porosity in Castings, Process for", covering details of preparing, impregnating, cleaning, and testing castings, allows several methods of impregnation to be used, but experience has proven the vacuum and pressure procedure outlined under Method C in the specification to give superior results. Most military work is impregnated in accordance with Specification MIL-I-7878.

The companion specification of MIL-I-7878 is Military Specification MIL-I-6869A, "Impregnants for Aluminum Alloy and Magnesium Alloy Castings". The only products of any importance are those listed in the Military Qualified Products List, QPL-6869-2. These materials fall under the following general classifications:

Sodium silicate, with or without the addition of metallic flours.

Tung or linseed Oil.

Copolymers of styrene and linseed or castor oil.

Styrene-alkyd or diallylphthalate-alkyd copolymers (polyester resins).

The properties of the major types of sealants are summarized in Chart I.

Sodium silicates for higher temperature uses

Historically, sodium silicates were the earliest materials used for impregnating metal castings. Although sodium silicate alone is seldom used for non-ferrous metals, it enjoys a certain degree of popularity for use with steel castings because of its low material cost. Sodium silicate with the addition

HOEGANAES

Sponge Iron Powder

Part of the new sponge iron plant at Riverton, N. J.

Call in Your
Powder Metallurgy
Fabricator
For
Design Consultation

EKSTRAND & THOLAND, INC.
441 LEXINGTON AVENUE
NEW YORK 17, NEW YORK
Sellers of Hoeganaes sponge iron powder.

For additional information Circle No. 68 on the Reader Service Card

of iron or copper flours is used for impregnating all types of castings, principally for service at temperatures above the range of the superior organic sealants. The metal flours are claimed to oxidize within the pores of the casting, expanding in size and plugging the hole or channel even more tightly. The sodium silicates also have the advantages of low material cost and tolerance of high service temperatures. However, on baking, they lose water and shrink badly, and also have a tendency to react with some metals. They are somewhat abrasive, so that subsurface residues may injure bearing surfaces. Sodium silicate must be heated during impregnation, often resulting in changes in composition which complicate control. The metal flours used are usually 500 mesh and require agitation to keep them in suspension, not being true colloids. The metal powder fillers may filter out and bridge microscopic pores, later to be ruptured under wear, unsealing capillary ducts. The claimed oxidation of the metal fillers may generate the hazard of metal corrosion, and the sodium silicate absorbs moisture after the part has been impregnated.

Sodium silicate impregnants are recommended for use only where temperature requirements prevent use of organic impregnants. This will seldom be the case with aluminum or magnesium alloys, since the temperature restrictions on use of many of the alloys prevent operation at temperatures any higher than those allowable with the organic impregnants.

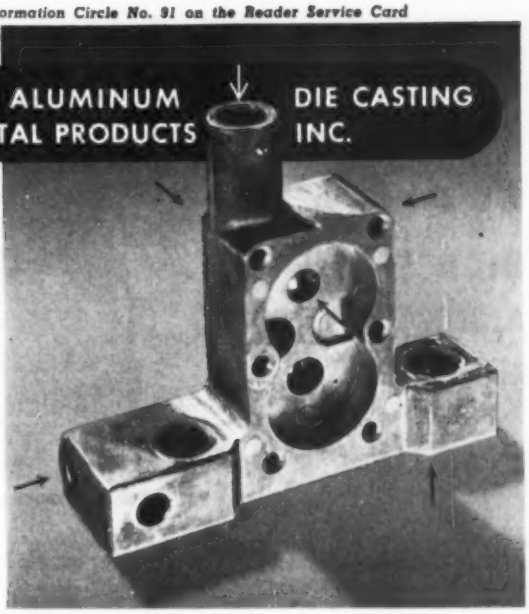
The vegetable oils have the disadvantage of being subject to oxidation. Since impregnation is generally done with a hot solution, the oils gradually oxidize, leading to very unsatisfactory storage and handling conditions. In addition, these materials have very poor mechanical strength and poor re-

continued next page

For additional information Circle No. 91 on the Reader Service Card

ZINC AND ALUMINUM by NELSON METAL PRODUCTS — DIE CASTING INC.

This oil pump gear housing is **CORED FROM 6 SIDES**



. . . to save on secondary operations.

- This is another example of Nelson's engineering service. We invite your inquiries.

Nelson metal products, inc.
510 32nd St., S.E. GRAND RAPIDS 8, MICHIGAN

When You Think of *Aluminum Ingot* THINK of S-G

The sign, S-G, on aluminum ingot means aluminum of uniform quality made to meet the most rigid chemical and physical specifications. Whether it's for permanent mold, sand or die cast you can be sure with S-G ingot.

Our complete modern research and testing laboratories are available to help you secure just the right ingot to meet your needs.

BRASS AND BRONZE INGOT ALSO PRODUCED TO YOUR SPECIFICATIONS

SONKEN-GALAMBA *Corporation*
MEMBER ALUMINUM RESEARCH INSTITUTE
Riverview at 2nd Street • Kansas City 18, Kansas

For additional information Circle No. 93 on the Reader Service Card

For additional information Circle No. 82 on the Reader Service Card

NEW!

HIGH SPEED A.B.C. DIE CASTING MACHINE

Free Cycles Over 1000 Shots Per Hour

Here's the new A·B·C high speed, low cost die casting machine which eliminates costly production of small die castings on large die casting machines. Air operated, the machine produces small non-porous lead, tin and zinc alloy precision die castings up to 1½ lbs.

The A·B·C is economical to operate and easy to set up. Its lightning production speeds makes single cavity molds practical and profitable.

STANDARD EQUIPMENT INCLUDES:

- 4 TIE BARS
- AUTOMATIC TIMING
- CALIBRATED TEMPERATURE GAS CONTROL
- GAS BURNERS
- DIE BLOCKS
- AIR REGULATOR
- FILTER
- OILER
- SAFETY SHOT INTERLOCK

Write today for engineering data and prices. Ask for bulletin A-10.

A B C

DIE CASTING MACHINE CO.

339 W. 112th PLACE · CHICAGO 28, ILLINOIS

SEALING CASTINGS — Cont.

sistance to chemicals and solvents. They are generally unsatisfactory as casting sealants.

Styrenated oils, while somewhat better than pure oils, have the disadvantages of deterioration during storage, flammability, and poor properties; so they are generally not recommended.

Polyester resins are the most satisfactory materials for impregnation of metal castings, and at present there are two types of these resins in use, the styrene-alkyd polyesters and the diallyl-phthalate-alkyd polyesters. There is little difference in the ultimate sealing efficiency or the permanence of seal between these two materials, although the former often requires multiple impregnating cycles to achieve a satisfactory seal. It is in the conditions of use that the principal differences are found.

Are You Getting the Best Castings Made?

CENTRAL SERVICES PROVIDE:

- Complete engineering and design service
- Wide range of quality aluminum and zinc alloys
- Die and Tool making
- Machining and finishing facilities

Central offers complete modern facilities, strategically located which assures you of getting prompt dependable service on the best castings made.

Make use of our complete service and mail in your defense production requirements for prompt quotation.

CENTRAL

DIE CASTING and MFG. CO.

2935 West 47th Street • Chicago 32, Illinois

For additional information Circle No. 85 on the Reader Service Card

Severance HIGH SPEED CARBIDE

SEVERANCE REGRINDING SERVICE

CONSERVES STRATEGIC MATERIALS
ASSURES DEPENDABLE DELIVERIES
SAVES YOUR MANHOURS
PAYS DOLLAR WISE

HAVE YOUR DULL CUTTERS REGROUND REGULARLY

THE Severance LINE INCLUDES

Severance TOOL INDUSTRIES INC.

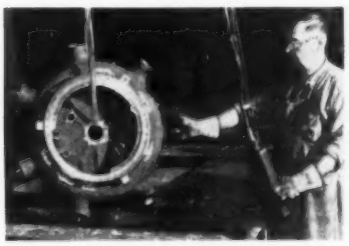
732 Iowa Ave., Saginaw, Michgan

If you don't have a SEVERANCE "ALL STAR" Catalog, ask for one today!

Circle No. 107 on the Reader Service Card

The styrene-alkyd polyesters are slightly modified versions of resins originally developed as low pressure laminating resins. In most cases, the materials are purchased from the major resin manufacturers and are packaged and sold under proprietary labels. They were not originally developed for, but have been adapted to, impregnation processes, and are available from several suppliers.

The styrene-alkyd polyesters, while 100 percent solids materials, often require two or more impregnating cycles to assure complete sealing of some parts, since the high volatility of the styrene makes it difficult to hold a high vacuum and causes vaporization during treatment and curing.



CASTING of collector for Pratt & Whitney Aircraft Double Wasp engine is thoroughly cleaned before being placed in automatic autoclave where it will be made leakproof by vacuum-pressure impregnation with DAP polyester.

The high volatility and sharp odor of the styrene often causes toxicity and odor complaints. Also, the low flash point of the styrene (88F) introduces hazards of fire and explosion nearly as great as those encountered with gasoline. In many cases, acetone is recommended as the material to use in cleaning the castings after impregnation, and this introduces additional fire hazards.

In spite of claims to the contrary, the styrene-base polyesters are all similar. They show styrene loss under high vacuum and during baking, and, in common with the diallyl-phthalate-base polyesters show an additional 7-10% volume shrinkage during curing. In spite of these disadvantages, the styrene-base polyesters are far superior to the sodium silicates, oils, or styrene modified oils.

The diallyl-phthalate-base polyester was originally developed during the early part of World War II specifically for the purpose of impregnating porous structures (metals, wood, asbestos board, electrical coils, etc.). At present, there is only one such resin approved on QPL-6869-2 and available[1].

The diallyl-phthalate-base polyester is also a 100% solids material. However, due to the very low volatility of the diallyl-phthalate, it does not boil

continued next page

DIE CASTERS! DIE MAKERS!

SAVE on Die Construction Time!

With D-M-E STANDARD

DIE CAST DIE ASSEMBLIES!

Using D-M-E

STANDARD CAVITY RETAINER SETS and EJECTOR BOXES

D-M-E Cavity Retainer Sets are of high quality Alloy Steel and are precision ground, flat and square. Std. plate sizes are from 7/8" to 5 7/8" thick and are aligned with sturdy, precision-built leader pins and bushings.

D-M-E Standard Ejector Boxes are of light-weight, welded steel construction. Std. sizes carried In Stock from 12" x 12" to 18" x 29½". When you specify D-M-E Standards, you get . . .

The Perfect Combination **For Quality Die Casting**

You'll SAVE TIME and MONEY with D-M-E STANDARDS!

Write TODAY for Catalog giving complete Specifications and Prices . . . !

DETROIT MOLD ENGINEERING CO.

6686 E. McNICHOLS ROAD — DETROIT 12, MICHIGAN — TWinbrook 1-1300

DME

HILLSIDE, N. J. (NEAR NEWARK) 1217 CENTRAL AVE., ELIZABETH 3-5840
CHICAGO 44, ILLINOIS 5315 W. LAKE STREET, COLUMBUS 1-7855
CLEVELAND 14, O.—D-M-E CORP. 5473 LAKE CT., ENDICOTT 1-0987
LOS ANGELES 7, CAL. 3700 SOUTH MAIN STREET, ADAMS 3-8214

For additional information Circle No. 66 on the Reader Service Card

away under high vacuum or during baking the way styrene does. The low volatility also contributes to yielding a slight, pleasant odor. The high flash point of the material (330F) considerably reduces hazard of fire or explosion. In addition, after impregnation of castings with this material, the surface of the casting may be rinsed quickly and easily by immersion in methylene chloride or by placing in a Detrex degreasing unit using methylene chloride. Alternatively, a wash in hot alkaline solution may be used. Since these materials are non-flammable, there is no fire hazard.

A hot wash is preferable with any of the polyester resins, as the exudation which occurs due to differences of thermal expansion of the resin and the metal takes place during the cleaning cycle and prevents further exudation during baking.

Both storage and tank life of diallyl-phthalate-alkyd polyesters are superior to the styrene-base polyesters, although it is necessary to maintain continuous aeration of the former in the tank in order to obtain long life. In contrast to the older types of impregnants, uniformity of the polyester resins may be maintained for long periods by controlling viscosity and cure times by additions of inhibitors and the reactive thinners according to the manufacturer's recommendations.

Since some metals, particularly aluminum and magnesium alloys, exhibit change in grain structure during exposure to elevated temperatures for various periods of time, it is necessary to choose a curing temperature which will not affect the properties of the metal. The polyester resins may be cured at various temperature levels depending on requirements, and the manufacturers are in a position to recommend baking cycles for various alloys.

After impregnation of metal castings with the polyester resins, the resins will withstand the following conditions:

Operating temperatures from -65F to 350F continuously or up to 400F intermittently.

Pressures up to those necessary to cause failure of the casting.

Solvents, including petroleum products.

Corrosive chemicals of most types, although not hot, strong alkalies.

Hot water, salt water, or soap solutions.

Castings which have been properly cleaned after impregnation will show no surface stain or film, and the treatment will not interfere with painting, plating, or anodizing. If desired, the film of resin may be left on the casting and will add to the corrosion re-

HOLTZMAN
Guaranteed
ALUMINUM INGOT
Brass Ingot
Bronze Ingot
To Your Specifications!
A Holtzman certificate of analysis is your guarantee of just the right ingot to meet your needs. Complete, modern testing laboratories assure HOLMCO products meet the most rigid chemical and physical specifications.
PROMPT DELIVERY • DEPENDABLE SERVICE
M. HOLTZMAN METAL CO.
Smelters and Refiners
SINCE 1900
HOLMCO
WRITE • WIRE • OR PHONE
CHESTNUT 3820
5223 McKISSOCK AVE., ST. LOUIS, MO.
For additional information Circle No. 70 on the Reader Service Card

sistance of the metal.

The important properties required of a sealant have been described by a manufacturer of impregnating equipment: "In general, it may be said that the best impregnants are those of low viscosity, preferably of low volatility, which dry or cure to solid infusible materials with little or no loss of volume. They should tolerate temperatures of 300F and have no effect on machinability of the impregnated part."

A diallyl-phthalate-base polyester fulfills all these requirements. Its only disadvantages are — the necessity for aerating the catalyzed material in storage, the requirements that equipment must be designed and installed to allow complete drainage, and the limitation of service temperatures to 400F intermittent, or 350F for constant service. However, the material has as good temperature resistance as the other organic impregnants, and is superior to other impregnants for general use with aluminum and magnesium castings. It is no better than the styrene-alkyd polyesters in efficiency and permanence of seal and general durability in service, but it has appreciable advantages in conditions of use, with resulting savings in time and money to the user.

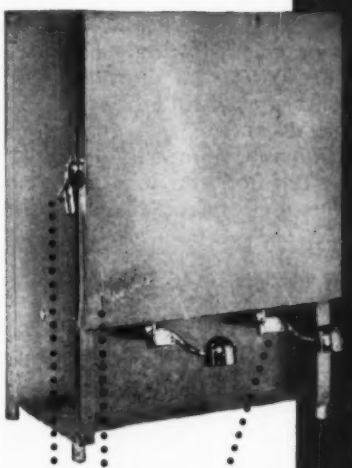
'.General Electric's 3225 Permafil.

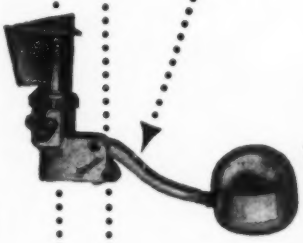
ORDNANCE APPROVAL
continued from page 47

agencies alike to advocate the use of zinc die castings. How well I remember the days in early 1941 when six or eight officials of your industry visited General Barnes' office in the Social Security Building. Conditions in connection with the use of die castings had just about reached a head. At that conference, the industry representatives were requested to appoint one of their outstanding engineers to assist Ordnance engineers in the

Here's How

TWIN CITY CASTINGS
CUT PRODUCTION COSTS
on the
NORRIS MILK DISPENSER VALVE
and CABINET HARDWARE





You get *more* than metal in Twin City Castings. Over 30 years of sound, feet-on-the-ground experience has given the Twin City Die Casting Co., the die-making ingenuity and casting know-how that provides a service *plus* . . . so often hard to find in today's business world. Here's an example of what we're talking about:

THIS WAS THE JOB:

Produce dies and cast parts for the popular Norris Milk Dispenser that will reduce costs over previous machining methods. Design it to pass strict sanitary codes . . . to be attractive in appearance, practical to the job.

THIS WAS TWIN CITY'S ANSWER:

All specifications were met and held. Cooperating with Norris engineers, an easy method of opening the valve was devised to enable restaurant personnel to handle the valve even with hands full. The Norris Milk Dispenser passes sanitary codes with flying colors. AND production costs dropped.

HERE'S WHAT THIS CAN MEAN TO YOU!

Twin City's ability and willingness to work with your engineers to cut your final production costs . . . its years of experience and casting know-how can show real profits for your company. Write, let Twin City Engineers demonstrate that *service plus* to you.

TWIN CITY DIE CASTINGS CO.
3351 TALMAGE AVE. S.E. · MINNEAPOLIS 14, MINN.

For additional information Circle No. 55 on the Reader Service Card

proper application of your product. Within a surprisingly short time, Mr. William During was recommended and placed on the Government payroll. But, in addition, your industry had the foresight to appoint a strong technical advisory committee of other outstanding engineers. Theirs was not an easy assignment, since both Ordnance and industry had a great deal to learn regarding die casting quality requirements for Ordnance material, but from that day die castings were used in increasing quantities.

"It is with great pleasure that I say that Mr. During and your Technical Committee worked unstintingly in the interests of the Ordnance Department. With a fine and careful distinction as to quality, the industry voluntarily undertook to develop and to meet specifications never deemed possible before. The safety and service requirements of individual parts were studied. X-ray inspection standards for many vital parts were established, and adopted as the standards of minimum quality which would be supplied. The Technical Committee instituted complete metallurgical control of alloys, and established housekeeping procedures within the industry, which would assure uniformly sound and satisfactory castings. Procedures which previously had been construed as trade secrets were willingly and openly discussed with others in the industry.

"When primary aluminum became unavailable, your industry contributed immeasurably to the development and application of a secondary type of aluminum alloy. Because of your patriotism and through your persistence, this alloy and its processing methods were perfected, and because of that the Ordnance Department was able to supply the quantities of ammunition used so successfully on every battlefront.

"There has not been a single instance, called to our attention where die castings have proved inadequate because of unsound engineering, soundness or other qualities under control of the die casting industry. This is indeed a splendid record.

"Today's war is a war of firepower. Our Armies are advancing in Europe, and successfully assaulting Japanese held Pacific islands because they can deliver a crushing weight of high explosives on the enemy targets. Reports from the theaters of operations daily reflect the significance of firepower. Our troops are advancing into enemy territory with the full confidence that if a town or fortification proves too stubborn in its resistance, our artillery and bombs can literally level it to the ground. The die casting industry can be very proud of its contribution to this success of our material and our troops".

here's how BIG INDUSTRIES SAVE on SMALL PARTS

PARTS FOR Electronics Products
PARTS FOR Toy Products
DIE CAST BY GRIES IN ONE OPERATION
PARTS FOR Personal Products
PARTS FOR Electrical Products

GRIES DIE CASTINGS CAN SOLVE YOUR SMALL PARTS PROBLEMS TOO — IN ONE OPERATION!

GRC zinc alloy die castings open extraordinary possibilities for new designs, products and economies, by producing the most intricate tiny parts in one high-speed operation. Gries offers fast delivery of 100,000 pieces to many millions on completely finished small parts. Write today for bulletin and samples—GRC may already have your problem solved or can solve it quickly and economically. Send prints for quotations.

America's Foremost PRODUCERS of Tiny Die Castings

SMALLNESS UNLIMITED
Max. Wt. ½ oz.
Max. Lgth. 1¾"

GRIES REPRODUCER CORP.

Manufacturers of Small Castings EXCLUSIVELY

157 Beechwood Ave., New Rochelle, N. Y., NEw Rochelle 3-8600

For additional information Circle No. 89 on the Reader Service Card

ADVERTISERS' INDEX

SEPTEMBER, 1953

A

A. B. C. Die Casting Machine Co. 118
Accurate Die Casting Co. 104
Acheson-Colloids Co. 33
Advance Tool & Die Casting Co. 96
Ajax Engineering Co. 11
Aldrich Pump Co. 20
Allied Research Products, Inc. 80
Almco Div., Queen Stove Works, Inc. 75
Alumicast Corporation ....Cover III
Aluminum Smelting & Refining Co. 4, 5
American Chemical Paint Co. 92
American Die Casting Institute, Inc. Cover II
American Zinc Sales Co. 28
Antara Chemicals Division, General Dyestuff Corp. 37
Apex Smelting Co. ....Cover IV
Armour & Co. 82
Atlantic Casting & Engineering Corp. 14

B

B & T Engineering Co. 34
Badger Die Casting Corp. 93
Belmont Smelting & Refining Works, Inc. 107

C

Cannon-Muskegon Co. 108
Cast-Master, Inc. 1
Celanese Corporation of America, Chemical Division 10
Central Die Casting & Mfg. Co., Inc. 118
Central Screw Company 90
Certified Alloys Company 4, 5
Cleveland Automatic Machine Co. 38
Cleveland Hardware & Forging Co. 95
Crucible Steel Company of America 21

D

Detroit Mold Eng. Co. 100, 119
Doehler Jarvis Division, National Lead Co. 60, 61
Dollin Corp. 43

E

Eaton Manufacturing Co., Reliance Div. 88
Ekstrand & Tholand, Inc. 116
Engineered Precision Casting Co. 108

F

Federal Die Casting Co. 110
Federated Metals Div., American Smelting & Refining Co. 111

G

Globe Stamping Division, Hupp Corp. 85
Grav-i-Flo Corporation 72
Gries Reproducer Corp. 122
Groov-Pin Corp. 76

H

Harper Electric Furnace Corp. 112
C. I. Hayes, Inc. 9
Henning Bros. & Smith, Inc. 7
Hitchiner Mfg. Co., Inc. 94
M. Holtzman Metal Co. 120
Hoover Co. 2
Howard Foundry Co. ....Cover III
Hydraulic Press Manufacturing Co. 16

I

Injection Molders Supply Co. 113
International Nickel Co., The 36
International Powder Metallurgy Co. 105

J

Jersey Plastic & Die Casting Co. 110
William F. Jobbins Co. 69

K

Kelvin Systems Corp. 8
Kiowa Corporation 29
Kux Machine Co. 55

continued next page

UNIVERSAL
Die Castings

Preferred WHEN ONLY THE BEST IS GOOD ENOUGH

There must be a reason why so many highly discriminating manufacturers entrust *all* of their work to us. The reason is they *know* from experience that the finished job will meet every specification as to appearance, strength, accuracy and function. Furthermore, the price on either long or short runs is in line with their production and selling costs.

If you are located west of the Mississippi River we are in an excellent position to take care of your die casting requirements. Quotations made promptly.

UNIVERSAL
DIE CASTING COMPANY

5001-05 SANTA FE AVE. • LOS ANGELES 11, CALIF. • TELEPHONE: KIMBALL 7264

For additional information Circle No. 78 on the Reader Service Card

INDEX OF ADVERTISERS

continued from page 123

L

Lake Erie Engineering Corp. 26, 27
Lester-Phoenix, Inc. 42
Lewis Welding & Engineering Corp. ... 24
Lindberg Engineering Co. 30
Litemetal Dicast, Inc. 101

M

The MacMillan Co. 107
Madison-Kipp Corp. 17
Metal Hydrides, Inc. 97
A. Milne & Co. 98
Milwaukee Die Casting Co. 112
Minnesota Mining & Mfg. Co. 89
Monarch Aluminum Mfg. Co. 31
Mt. Vernon Die Casting Corp. 39

N

Nelson Metal Products 117
New England Die Casting Co. 105
New Jersey Zinc Co. 15
Newton-New Haven Co. 12
Nobur Mfg. Co. 74

O

Oakite Products, Inc. 88

P

Palfy Die & Mold Co. 103
Pangborn Corp. 91
Paragon Die Casting Co. 99
Paramount Die Casting Co. 102
Parker Kalon Corp. 78
Parker White-Metal Co. 32
Peerless Gear & Machine Co. 113
Precise Products Co. 74
Precision Castings Co., Inc. 23
Pressure Castings, Inc. 19

R

Racine Die Casting Co. 108
Reed-Prentice Corp. 6
Roll-Brite Corp. 91
Roto-Finish, Inc. 86

S

The George Sall Metals Co., Inc. 103
St. Joseph Lead Co. 41
E. M. Scott Chemical Co. 25

T

Severance Tool Industries, Inc. 118
G. W. Smith & Sons, Inc. 22
Sonken-Galamba Corp. 117
Spincraft, Inc. 110
Stewart Die Casting Div. Stewart Warner Corp. 35
Stroh Die Moulded Castings Co. 124
Stroman Furnace & Engineering Co. 40
Superior Die Casting Co. 66

Thompson Products, Inc., Metallurgical Products Div. 44
Twin City Die Casting Co. 121

U

U. S. Reduction Co. 18
United Chromium Inc. 77
Universal Die Casting Co. 123

V

Van Dorn Iron Works Co. 68
Vanadium Alloys Steel Co. 13

Z

Z & H Mfg. Co. 107

50 YEARS
PRODUCING
DIE CASTINGS
Stroh is the name for you to remember when you want first quality die castings in zinc.
We have some customers who have been with us since we started in business, and we promise you the same kind of service that has kept these customers satisfied for so many years. Let us quote on your prints.
STROH DIE MOULDED CASTING CO.
525 East Michigan St., Milwaukee 2, Wisconsin

For additional information Circle No. 77 on the Reader Service Card

How This Electronic Wonder Saves on Your Permanent Mold Casting Costs

A quantometer is an intricate electronic machine, that tells a metallurgist if an alloy is to specifications chemically.

Simply put, that is the prime function of a quantometer. Beyond that, we've discovered it is an honest money-saving device both for ourselves as well as our customers.

Let's say we have one of your aluminum parts in production. We're about ready to pour one heat of your alloy. Before we do, our metallurgists take a sample of the melt. In disk form, the sample alloy is put in our quantometer.

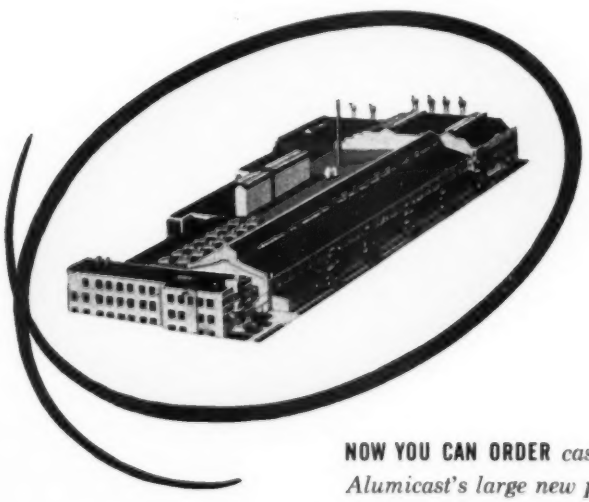
A little less than three minutes later (about 10 minutes from pot to analysis) and our metallurgists know the answer. There's no human error, no guess work, in deriving your correct chemical composition.

This laboratory control procedure is followed on every heat with every Alumicast permanent mold casting job. Your production schedule is constantly protected from interruptions due to chemical composition losses.

Unlike the spectograph, which requires almost an hour and a half to analyze 16 different elements of one heat, the quantometer gives an accurate analysis, in minutes, of both "as-cast melts" and "heat treated melts".

Thus, we also save time in getting each melt into foundry production, thence to finish machining, and to you. Per week, the time saved actually amounts to a full day's production.

This modern foundry method is just one of many ways in which Alumicast can serve you efficiently. You are invited to submit your prints for prompt quotation of patterns, dies, castings and finish machined parts. There is no obligation.



Alumicast IF

CORPORATION

UNDER THE MANAGEMENT OF HOWARD FOUNDRY COMPANY

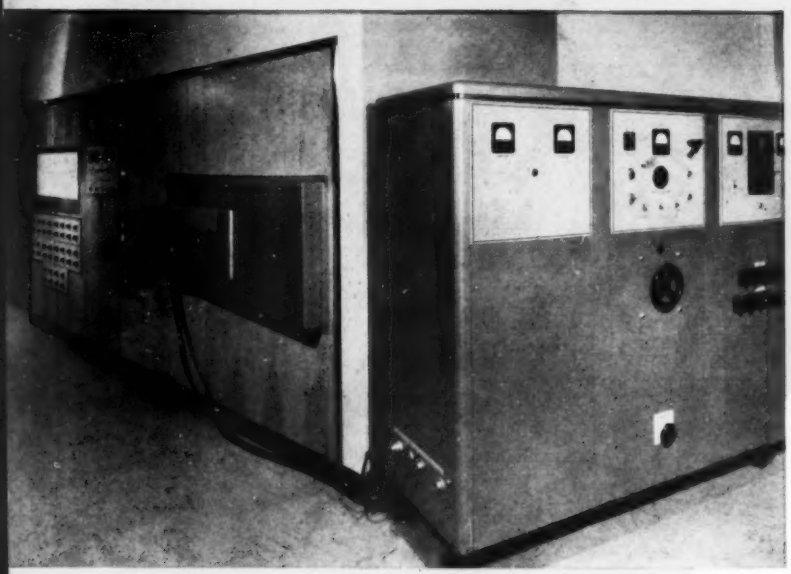
1703 N. KOSTNER AVENUE • CHICAGO 39, ILLINOIS

ALUMINUM • MAGNESIUM • BRASS • BRONZE • COPPER • ALLOY STEEL
ELECTRIC ALLOY STAINLESS STEEL • GRAY IRON • DUCTILE IRON
SAND CASTING • PERMANENT MOLD CASTING • FERROUS & NON-FERROUS INVESTMENT CASTING • CHEMICAL & METALLURGICAL RESEARCH & CONTROL LABORATORIES • WOOD & METAL PATTERNS • MACHINING FACILITIES

NOW YOU CAN ORDER *cast machined parts from one source. Alumicast's large new plant includes facilities for making wood and metal patterns, dies, castings and machining.*

For additional information Circle No. 18 on the Reader Service Card

APEX



Quantometer Control—This modern, direct reading spectrograph provides electronically precise control of Apex alloy production.

ZINC ALLOYS

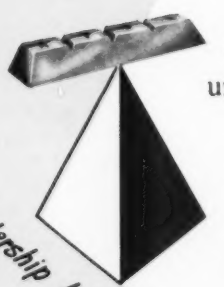
positive uniformity

...palletized for easy handling

30th Anniversary Year

Your Apex zinc alloy is produced with precision control from special high grade raw material to finished ingot. You're assured consistent uniformity through continual spectrographic analysis with the newest quantometer equipment. Apex alloys for 30 years have met industry's most rigid specifications — offering excellent foundry characteristics and dependable castability. And Apex offers you modern palletized packing for easier handling of alloy ingots. *Specify* Apex zinc alloys . . . produced with precision, quantometer control, absolutely uniform for superior performance in *your* foundry operation.

We welcome your inquiry



Research leadership back of every ingot

APEX SMELTING COMPANY

CHICAGO CLEVELAND LOS ANGELES

For additional information Circle No. 6 on the Reader Service Card